

TROPICAL DISEASES BULLETIN

VOL. 49]

1952

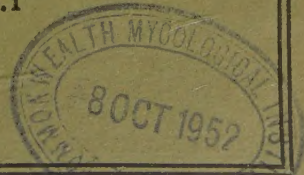
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Issued under
the Direction of the
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BUREAU OF HYGIENE AND TROPICAL DISEASES,
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TROPICAL DISEASES BULLETIN

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SUMMARY OF RECENT ABSTRACTS*

VII. HELMINTHIASIS

TREMATODES

Schistosomiasis, General

The Ross Institute has issued a pamphlet on schistosomiasis which is reviewed on p. 568 ; it deals with epidemiology, biology and control.

SCHWETZ (p. 1002) has written a résumé of existing information on schistosomiasis in the Belgian Congo, which should be read in full. He shows (pp. 1003, 1004) that there is a high incidence of both vesicular and intestinal infection in one place where infected *Planorbis* and *Physopsis* are found, but although these two genera exist near Elizabethville, only intestinal schistosomiasis is present there and infection has only been found in *Planorbis*. At Sakania, on the other hand, though both genera are present, he (p. 1004) found the vesicular disease.

A monograph on the snail hosts of the schistosomes of Africa, by MOZLEY, is reviewed on p. 1055.

BEQUAERT and DE LUCENA (p. 743) state that *Bulinus tropicus* and *Biomphalaria alexandrina pfeifferi* have been found breeding in Brazil. They were probably introduced from Africa in the slave-trading days. *Schistosoma haematobium* does not exist in Brazil.

Both *Bulinus truncatus* and *Planorbis* [*Biomphalaria*] *boissyi*, when lightly infected with *S. haematobium* or *S. mansoni*, may carry the infection for the rest of their lives. BARLOW and MUENCH (p. 1005) have estimated their life-spans—*B. truncatus* 14 months, *P. boissyi* 19 months.

BARLOW (p. 273) describes the construction and maintenance of ponds for rearing snails.

NOLAN (p. 273) shows that at 20 p.p.m. copper sulphate did not kill *Australorbis glabratus* or *P. boissyi* in exposures up to 5 hours, but *Bulinus contortus* was more susceptible.

KUNTZ and STIREWALT (p. 273) find that two dinitrophenols show considerable activity against *A. glabratus* and *B. contortus*, one being toxic at 2-3 p.p.m. for 24 hours. This is only slightly toxic to mammals and aquatic

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1951, v. 48. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

plants and invertebrates, but both are lethal to goldfish in the strength sufficient to kill snails. HALAWANI *et al.* (p. 1013) show that pentabromophenol and pentachlorophenol kill snails and their eggs at 1-5 p.p.m. and schistosome eggs, miracidia and cercariae at 5-10 p.p.m. McMULLEN (p. 1019) records the progress made in a systematic search for substances toxic to snails; 40 of 4,379 chemicals showed activity.

AZIM and COWPER (p. 568) discuss the maintenance of various species of *Schistosoma* in laboratory animals; monkeys are the most suitable hosts, but gerbils have considerable advantages.

A perfusion technique for recovery of immature and mature schistosomes from animals is described by PAN and HUNTER (p. 1012).

Diagnostic procedures

Rectal biopsy is widely used for all forms of schistosomiasis. NEWSOME (p. 1006) found *S. haematobium* eggs in 23 of 95 Egyptian prisoners so examined, none of whom had eggs in the urine, and *S. mansoni* in only 2. This "negative urine, positive rectum" condition is common. Biopsy shows that cure is less common than more perfunctory tests indicate. VAN WEZEL (p. 476) writes in a similar strain from the Transvaal, but notes that the incidence of *S. mansoni* is also high and that double infections are fairly common. In Brazil VASCONCELLOS and LIMA (p. 167) find rectal biopsy useful but not infallible; by concentration methods eggs can sometimes be found in faeces when biopsy is negative.

For *S. japonicum* HAMRICK *et al.* (p. 171) found rectal biopsy positive in 30 of 80 Filipino soldiers without gross evidence of schistosomiasis; 21 of the 30 had lesions visible on sigmoidoscopy, but in only 8 could eggs be found in faeces. HUNTER *et al.* (p. 570) write somewhat similarly of Australian soldiers exposed to infection; biopsy was often positive some months after treatment with Fouadin. Liver puncture is also valuable in disclosing chronic *S. mansoni* and *S. japonicum* infections (TEN BERG, p. 167).

Skin tests are widely used. With cercarial antigens some false positive results were found by VAN WEZEL (p. 476) and by LURIE and DE MEILLON (p. 901), but the latter did not find false negative reactions in cases or controls, which would have been more important. COUTINHO (p. 479) in Brazil uses an antigen from adult *S. mansoni*, which gives few false reactions. With an antigen from adult *S. japonicum* or the cercariae, PESIGAN *et al.* (p. 1015) found a few false positive skin tests, but up to 25 per cent. false negatives or doubtfully positive reactions in proved cases.

Complement-fixation tests with an antigen from the hepato-pancreas of infected *Australorbis* were positive in 96.4 per cent. of 722 persons passing eggs of *S. mansoni*, and negative in 72 uninfected controls (COUTINHO and COUTINHO, p. 569).

Schistosoma haematobium infections

There is a fairly high incidence of *S. haematobium* infection in one area of Somaliland (LIPPARONI, p. 477), and the disease is endemic in the Belgian Congo, where GILLET (p. 48) reports on the island of Mateba. In Iraq, WATSON (p. 653) notes that the snail host *Bulinus truncatus* is, in general terms, confined to the perennially irrigated area, and discusses the factors which influence its distribution.

DE AZEVEDO and COLAÇO (p. 378) compare measurements of eggs and adults of Portuguese and African strains of *S. haematobium*.

BARTONE (p. 379) describes a case of *S. haematobium* infection of the lung with haemoptysis (from Cyrenaica); CAMAIN *et al.* (p. 819) two of infection of the uterine appendages (from Dakar); BITSCHAI (p. 568) the clinical features of

urinary tract infection; EL-SADR (p. 480) of the ureter (which may need late surgical treatment); and BADIR (p. 744) a case in which a male and a female worm were found in a dilated orbital vein under the conjunctiva.

Results previously obtained in schistosomiasis in Egypt by administration of Miracil D have not been satisfactory, but NEWSOME and HALAWANI (p. 48), by giving Miracil D or Miracil A in courses of 1 gm. in cachets morning and evening for 3 days, and repeating this two or three times at intervals of a month or more, have achieved considerable success in patients with *S. haematobium* infection, who were carefully observed. There were some unpleasant side-effects. NEWSOME (p. 1006) later used Miracil D salicylate in place of the hydrochloride previously used; it gives fewer side results and is adequately absorbed.

WATSON *et al.* (p. 1005) obtained good or promising results in 25 patients with Nilodin, but there were some unpleasant reactions. On the other hand, although some good clinical results with Nilodin in *S. haematobium* infections were obtained by SCHWETZ (p. 481), the parasitological results were poor.

ERFAN and TALAAT (p. 49) and WATSON and PRINGLE (p. 480) write favourably of sodium antimony gluconate given intravenously in 6 per cent. solution.

General accounts of control schemes are given by ABDEL-AZIM and BARLOW (p. 169) for Egypt (1947-48), WATSON (p. 170) for Iraq, and BLAIR (p. 1073) for S. Rhodesia. Some details are given in the original abstracts.

Schistosoma mansoni infections

The intensity of *S. mansoni* infection in Brazil is indicated by COSTA (p. 378), who reports an average rate of over 10 per cent., with limits of 0.04 and 29.8, in 11 States. In Uganda, SCHWETZ (p. 1007) has found the infection at an altitude of 6,300 feet.

The effects of light, temperature and pH on the hatching of *S. mansoni* eggs have been studied by MALDONADO *et al.* (pp. 50, 1008). STIREWALT (p. 1008) reports the frequency of bisexual infections of *Australorbis glabratus* with miracidia of *S. mansoni*; a single miracidium produced unisexual infection of the snail, shown by the sex of the adult worms found in mice infected by the cercariae from that snail. Bisexual infections resulted from cercariae from some, but not all, snails infected by more than one miracidium. PARAENSE and SANTOS (p. 272) infected animals, each with cercariae of *S. mansoni* from a single snail, and found that 13 per cent. eventually harboured both male and female schistosomes; the remainder had either male or female, but not both.

BUTTNER (p. 478) discusses hermaphroditism in an African strain of *S. mansoni*, which is probably an inherent trend of this strain.

BUEDING (p. 653) discusses the carbohydrate metabolism of *S. mansoni*, relating it to the action of various drugs. With PETERS (p. 654) he investigated the ability of certain naphthoquinones to inhibit glycolysis by this species, but none was found to show sufficient activity *in vivo* to warrant a clinical trial.

STANDEN (p. 901) has devised means by which *Australorbis glabratus* can be maintained satisfactorily in the laboratory; he uses an artificial food in calcium alginate gel, on which they feed voraciously.

SCHWETZ (p. 655) has shown that *Biomphalaria alexandrina* var. *stanleyi*, and also some riverine snails of which the nomenclature is complicated, are natural hosts of *S. mansoni* near Lake Kivu in the Belgian Congo. ARDEL-MALEK (p. 656) found Egyptian *P. boissyi* not susceptible to Porto Rican strains of *S. mansoni*, though susceptible to Egyptian strains. The age of the snails had little or no effect on susceptibility.

Post-mortem studies in three Sudanese cases of *S. mansoni* infection indicated that the pathology conformed to that of *S. japonicum* infection rather than *S. mansoni*, and this may be a feature of the Sudan disease (MUSTAFA, p. 50).

STIGLIANI (p. 569) writes on the histopathology of *S. mansoni* invasion of unusual sites of the body.

LE POOLE (p. 1009) gives an account of chronic *S. mansoni* infection in people not subject to reinfection and living under good conditions. In such circumstances it is a relatively mild condition.

JULLIEN-VIEROZ *et al.* (p. 52) describe several patients in Martinique who had splenomegaly due to *S. mansoni* infection. Medical treatment will not arrest the development of splenomegaly when once it has begun, and splenectomy, where necessary, should be performed before ascites and severe anaemia develop.

MEIRA *et al.* (p. 821) discuss pulmonary schistosomiasis and describe cases from Brazil. In one brought to post-mortem examination the changes were not marked except for thickening of the affected pulmonary arterioles. KENAWY (p. 51) writes of the cardiac condition (cor pulmonale) which results from the ova of *S. haematobium* or *S. mansoni* causing arteritis of the pulmonary arterioles. This widespread obliterative pulmonary arteritis leads to rise in pressure in the pulmonary artery, and hypertrophy of the right ventricle. He discusses the features and treatment of this condition, which is not uncommon in Egypt.

ARMBRUST (p. 168) from Brazil records 4 cases of genito-urinary lesions in *S. mansoni* infection.

SEIFE and LISA (p. 168) describe diabetes and pyelephlebitis as complications of *S. mansoni* infection.

DE BIE and DELVILLE (p. 820) discuss the relationship between hepatic schistosomiasis and cancer. The former is not causally related to periportal cirrhosis, whereas primary hepatic cancer is so related. Primary cancer of the liver is rare in Katango, where the authors worked, though *S. mansoni* infection is very common.

LAGRANGE and SCHEECQMANS (pp. 1011, 1012) write on experimental *S. mansoni* infections in laboratory animals.

As a result of treatment and health education a great reduction in the incidence of *S. mansoni* infection in part of Porto Rico has been achieved by OLIVER GONZÁLEZ *et al.* (p. 54).

KOCH and KUX (p. 1132) show that in Brazil a daily dosage of 0.6 gm. of Miracil D from the beginning is too toxic for general use, but by giving small doses at first, gradually increasing, fairly good results can be obtained with a total of about 6 gm. given in 7-10 days.

On an experience of 39 patients, RODRIGUEZ-MOLINA *et al.* (p. 481) conclude that anthiomaline in one course of 30 cc. (2 courses in one case) is not very efficient in *S. mansoni* infection. SCHUBERT (p. 380) reports on several antimony compounds which when administered by mouth or intraperitoneally have shown action on *S. mansoni* infections of mice and golden hamsters.

OLIVER GONZÁLEZ and THILLET (p. 53) have tried Necroton (a substance derived from liver) in *S. mansoni* infection of mice, in relation to the hepatic lesions.

Miracil D and certain other substances have powerful action on miracidia and cercariae of *S. mansoni* and *F. hepatica*, though the antimony salts examined had not (LAGRANGE and SCHEECQMANS, p. 571).

MAUZÉ and LANGUILLON (p. 171) show that the addition of tartaric acid strengthens the action of FeSO_4 in killing *Planorbis guadeloupensis*. LAGRANGE *et al.* (p. 1013) show that Cetavlon and Zephirol kill *A. glabratus*, cercariae and fish at concentrations of 10^{-5} . BERRY *et al.* (p. 53) have found 6 substances which are very effective in killing *Australorbis glabratus* in its natural surroundings; 4 are expensive but 2 are reasonably cheap. Their toxicity for mammals is being studied; they were toxic to some fish in the concentrations used.

Schistosoma japonicum infection

In a report on *S. japonicum* infection in the Philippines, PESIGAN (p. 274) shows that *Oncomelania quadrasi* is abundant, and that the incidence of human infection is about 12 per cent. Fouadin caused disappearance of eggs in 78 per cent. of those treated. He (p. 1014) describes the various stages of *S. japonicum* infection in patients in the Philippines, in most of whom the infection was contracted before the age of 20, and most of whom were in the stage of early egg deposition with early hepatic irritation, amenable to treatment. Multiple exposure is the rule in endemic areas.

BURTNER (p. 744) describes the course of *S. japonicum* infection in 297 American soldiers in the Philippines. Proctoscopy was valuable in diagnosis. Cerebral involvement occurred in 10 patients, and changes were observed in the lungs of others 20–40 days after the onset of illness. Treatment was with tartar emetic and Fouadin, and full courses of these gave better results than smaller dosages.

An account of a case of cerebral schistosomiasis (*S. japonicum*) with epileptic manifestations is given by LICHTENSTEIN and SIMON (p. 657). SALIS and SMITH (p. 570) report a case of cerebral infection with *S. japonicum* in which treatment with intravenous potassium antimony tartrate was followed by complete recovery.

PESIGAN and his colleagues (pp. 1016, 1017) have evaluated treatment of *S. japonicum* infection with Fouadin. It does not aggravate any liver damage, or aggravate the condition of the blood. On experience of a large number of cases they conclude that it is fairly effective, and although toxic manifestations are common, they are usually mild. PESIGAN *et al.* (p. 1018) found that Nilodin (Miracil D hydrochloride) was not effective in *S. japonicum* infections in dosage recommended for other forms of schistosomiasis. Toxic reactions were common.

PAN *et al.* (p. 1019) describe a technique for infecting small mammals with *S. japonicum*.

Other schistosomes

A proved case of *S. bovis* infection of man is reported by RAPER (p. 1010) from East Africa. The symptoms were slight and transient, and eggs soon disappeared from the faeces.

CORT (p. 482) has written a monograph on the present state of knowledge of schistosome dermatitis. He makes the point that repeated exposure produces sensitization which may be very marked. The paper should be read in full. A dermatitis-producing schistosome cercaria, named *Cercaria littorinalinae* n.sp., is described from California by PENNER (p. 172).

Fasciola, Clonorchis and other trematodes

A study of *F. hepatica* and its snail host in Britain is recorded by ROBERTS (p. 54), and KENDALL and McCULLOUGH (p. 1020) write on the emergence of cercariae from *Lymnaea truncatula*.

DESCHIEENS and POIRIER (pp. 571, 658) describe the lesions found in guineapigs given injections of an extract of *F. hepatica*, and discuss the toxicity and allergic properties of such preparations.

RAMAGE (p. 381) reports a liver fluke in the common bile duct in a woman in England. LEVINA (p. 658) describes the symptoms of *F. hepatica* infection, and states that emetine is specific for it. BROUET *et al.* (p. 657) treated with Glucantime several patients who had *F. hepatica* infection, but the results were variable. They suggest that the older treatments, especially with emetine, still have value.

A high rate of infection with *Fasciolopsis buski* is found in part of Hunan, especially in children (CHEN and WU, p. 659). Two cases of this infection were

cured by hexylresorcinol and tetrachlorethylene, or gentian violet and chloroquine (BASNUEVO and SEUC-CHIU, p. 382).

Three persons from Shanghai, living in the United States, were found by AUGUSTINE and ISENBERG (p. 380) to be infected with *Clonorchis sinensis*, which has been associated with "pickled herring". There were no symptoms. HUECK (p. 1020) claims that Fouadin gives good results in this infection.

GARDUÑO and CARPIO (p. 483) describe three cases of paragonimiasis from the Philippines, in one of which there were unusual neurological signs.

An apparently new species infecting man, named *Opisthorchis guayaquilensis*, is described by RODRIGUEZ *et al.* (p. 382) from Ecuador.

LIE KIAN JOE and BRAS (p. 172) describe two cases of infection with *Plagiorchis javensis*.

REDDY and VARMAH (p. 660) describe a case of heavy infection with the rare echinostome fluke *Paryphostomum sufrartyfex*, from Madras.

PICK (pp. 172, 659) has studied the mode of attachment of *Watsonius watsoni* to the intestinal wall, its cephalic structure, and its feeding process. It is apparently a saprophytic feeder.

CESTODES

UPTON (p. 383) discusses the relationship between tapeworms and appendicitis.

A preparation containing tin has been used successfully by HIRTE (p. 1134) for tapeworm infection.

In a monograph of the distribution of the various tapeworms in Finland HUHTALA (p. 572) estimates that as many as 20 per cent. of the population harbour *D. latum*. VARTIAINEN (p. 1021) puts the incidence at up to 25 per cent. He has used thymol in treatment, and considers it the drug of choice whenever male fern is contraindicated on account of the patient's poor condition. Eggs of *Diphyllobothrium* were found by BROWN *et al.* (p. 475) in 32 of 97 Eskimos in the North-West Territories of Canada, and HITCHCOCK (p. 900) reports an incidence of 6 per cent. in Alaskan Eskimos. NEGhme *et al.* (p. 484) report several cases in Chile.

As a result of experimental work HUMES (p. 382) concludes that various species of *Diaptomus* are the most important natural hosts of primary importance for *Diphyllobothrium latum*, and that *Cyclops* are of secondary importance.

RUDAT (p. 572) describes a patient who had 5 *D. latum* at the same time, but whose health was practically unimpaired.

RAMAN *et al.* (p. 55) describe several cases of cysticercosis from India; in no case was there any radiological evidence of the condition. ALÉS REINLEIN *et al.* (p. 1133) discuss the cerebrospinal fluid in cysticercosis of the central nervous system, and especially the complement-fixation reaction, which they regard as very useful. GAUGUSCH (p. 1022) has studied the resistance of *Cysticercus cellulosae* to preservation at about freezing point, and to treatment with brine. Details should be sought in the original.

GRIFFITHS (p. 660) discusses the incidence of *T. saginata* infection of cattle and man in Britain. He makes the point that more women are usually affected than men, possibly as a result of handling raw meat. Mepacrine is useful in *Taenia saginata* and *Hymenolepis nana* infections (HOEKENGA, p. 1134). WOLFF and TEUSCH (p. 173) found *Hymenolepis nana* in a large proportion of German soldiers who returned from captivity in Russia.

Echinococcus infection is rife in Sardinia, and LIPPI (p. 55) shows that the numbers of patients admitted to hospital for this condition have recently been increasing. CHENEBAULT (p. 173) found pulmonary hydatid cysts in a proportion of persons examined radiologically in Morocco, and quotes other work to the effect that dogs are heavily infested there. Human infection is not as

rare as some workers have thought, and can be contracted in Casablanca itself. FAURE (p. 485) writes in the same sense for the Marrakesh region of Morocco.

MAGATH (p. 1023) notes that hydatid disease is rare in N. America, but RAUSCH and SCHILLER (p. 661) have found a high rate of infection in Alaska. The arctic fox carries the worm, and man may become infected by eating a certain green plant, which could easily be contaminated by the faeces of foxes. More investigation is needed. Incidence in Chile is fairly high (GAJARDO TOBAR, p. 383).

BOCCHETTI (p. 1023) has found the Casoni test positive in 71 per cent. of cases of hydatid disease. FANTA *et al.* (p. 822) write favourably of biological treatment of multiple hydatid cysts, by which they mean the injection of hydatid fluid, or derivatives of it, intradermally each week.

FAIN (p. 174) has found *Inermicapsifer arvicanthidis* in a child and a rat in Ruanda-Urundi; he concludes that *I. cubensis* should be regarded as a synonym of *I. arvicanthidis*.

Charles Wilcocks

(To be continued)

MALARIA

RUSSELL, P. F. **The Present Status of Malaria in the World.** *Amer. J. Trop. Med. & Hyg.* 1952, Jan., v. 1, No. 1, 111-23. [81 refs.]

There were until recently about 350 million cases of malaria annually in the world with a case fatality rate averaging about 1 per cent. Cases occurred over a wide geographical range, in many parts of which progress has now been made towards elimination, though the disease is still the most prevalent serious illness of man. The author reviews briefly the present status of malaria in each of the continents, referring to each of the major control schemes and discussing the natural recession of the disease in the United States and in Europe. He refers to many schemes, most of which have been reviewed in this *Bulletin*. There has been a recession in the United States owing to several interlocking causes, but conscious control was certainly important. Recession in Northern Europe is probably due to the influence of changing agricultural and social conditions on transmission by a predominantly zoophilic vector.

The paper is itself a review of major control schemes and should be consulted in the original by those concerned.

G. Macdonald

RUSSELL, Paul F. **Malaria. Basic Principles Briefly Stated.**

This book was reviewed on p. 733.

RAJENDRAM, S. & JAYEWICKREME, S. H. **Malaria in the Maha Oya Basin.** *Ceylon J. Med. Sci.* (Sect. D.) 1951, June, v. 8, Pt. 2, 85-142, 3 maps & 3 graphs. [11 refs.]

The authors have previously reviewed [this *Bulletin*, 1952, v. 49, 667] the epidemiology of malaria in Ceylon and the results of its control by residual insecticides, selecting 2 river valleys in the epidemic area as illustrative examples. The present paper reverts to one of these valleys only, giving a much fuller account of the epidemiology of the disease and its associated entomology than in the previous statement. It is put on record for historical purposes and to bring together a great amount of carefully collected statistical

matter which has an important bearing on the causation of epidemics, and is of interest in the study of epidemics in Ceylon and elsewhere. The outstanding features have been briefly commented on in the previous review and the present paper amplifies the relevant data in an instructive and valuable manner without adding to the subjects studied. It includes geographical data ; information on malaria prevalence in crude figures and as a rate per 1,000 population ; rainfall data ; a full statement of epidemic occurrences from 1935, but excluding the 1934/35 epidemic which was dealt with by BRIERCLIFFE [this *Bulletin*, 1936, v. 33, 218] ; vital statistics ; results of spleen and parasite surveys by location ; full numerical data on the prevalence of *A. culicifacies* larvae and adults by years ; and a statement of the control measures applied.

G. Macdonald

MALAYA, FEDERATION OF : **Annual Report of the Malaria Advisory Board for the Year 1950** [STRUTHERS, E. A., Chairman]. 23 pp., 1 coloured map. 1951. Kuala Lumpur : Govt. Press. [75 cts. or 1s. 9d.]

The report includes a fuller statistical statement than has been the past practice. It shows by individual States or Settlements the malaria admissions to and deaths in Government and estate hospitals, specified by month and, to some extent, by species of parasite. They are also shown as a percentage of the 1947 figures and additional data are given on out-patients, and acreage of rubber planted. The tables show a progressive decline in hospital admissions, those in 1950 being 53 per cent. of the 1947 figure. Circulars on Proguanil, and DDT and BHC are reproduced. They are factual statements, sufficiently full but readily understood. The development of resistance to proguanil therapy is not regarded as a bar to its use as a prophylactic. The use of DDT is recommended at doses of 100 mgm. per square foot every 3 months, or 200 mgm. every 6 months, while the recommended dose of BHC is from 10 to 40 mgm., preferably 20 mgm., of the gamma isomer per square foot every 3 months.

[The increase of statistics is an improvement. It would be bettered by the annual inclusion of a statement of the population of the States and, if possible, by a single retrospective statement of out-patients to give a background for the figures newly introduced. Examination of past reports shows that as judged by hospital admissions malaria reached a low level about 1933, then progressively increased to 1940 and broke out in epidemic form in 1942. It returned to about the 1933 level in 1947 and has since further declined. The figures show great variation and without further information it cannot be stated whether the present decline is natural or due to control.]

G. Macdonald

BLANC, F. & CROS, R. Note sur la présence d'un schizonte dans un monocyte du sang circulant. [Note on the Presence of a Schizont in a Monocyte in the Peripheral Blood] *Méd. Trop.* Marseilles. 1952, Jan.-Feb., v. 12, No. 1, 83-4, 1 fig.

The schizont was found in the blood of a patient from Indochina who, several months before, had suffered from malaria and had *P. vivax* schizonts in the blood.

MARTINI, E. Bemerkungen zur Rückfälligkeit der Malaria. [Observations on Malarial Relapses] *Riv. di Parassit.* Rome. 1952, Jan., v. 13, No. 1, 61-7.

Martini, in this paper, reminisces upon malaria, mostly of the benign type, and of its relapses as it occurred in German troops during World War II. The mortality was relatively low, but the problem concerning relapses was a serious one.

Philip Manson-Bahr

BIRTWELL, S. Attempts to prepare a possible Metabolite of "Paludrine" (Proguanil) and related 1 : 3 : 5-Triazines. *J. Chem. Soc.* 1952, Apr., 1279-86.

LOUGHLIN, E. H., RICE, J. B., WELLS, Helen S., RAPPAPORT, I. & JOSEPH, Aurele A., with the assistance of H. RENE. **The Treatment of *Plasmodium falciparum* Malaria with a Single Dose Antimalarial. A Preliminary Report of the Use of Hydroxychloroquine, 7-Chloro-4 (4'-(N-Ethyl-N-B-Hydroxyethylamino)-1-Methylbutylamino)-Quinoline Diphosphate.** *Antibiotics & Chemotherapy*. New York. 1952, Apr., v. 2, No. 4, 171-4, 1 fig.

Seventy-five patients suffering from *P. falciparum* malaria were treated at Gressier, Haiti, with a single oral dose of hydroxychloroquine, which has the chemical structure 7-chloro-4(4'-(N-ethyl-N-B-hydroxyethylamino)-1-methylbutylamino)-quinoline diphosphate. In most cases treatment was given within 24 hours of the current malarial attack, the dosage prescribed being 2 gm. for adults, 1.5 gm. for children from 6 to 12 years old and 1 gm. for children under 6 years of age.

There was a steady decline of pyrexia to normal in all instances by the third day, by which time asexual parasites were no longer seen in the peripheral blood in 96 per cent. of the cases. One patient complained of mild vertigo lasting for about half an hour, otherwise no toxic effects were observed.

The authors conclude that hydroxychloroquine in single doses is likely to prove a useful compound in the treatment of acute *P. falciparum* malaria.

G. Covell

WINCKEL, C. W. F. **Gametocidal Properties of Antimalarial Drugs.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1952, Mar., v. 4, No. 1, 71-7. [13 refs.]

See also p. 771, HOEKENGA, **The Prophylaxis of Malaria and Amebiasis with Milibis-Aralen.**

VINCKE, I. H. Note préliminaire sur la prophylaxie médicamenteuse par "Daraprim", en milieu rural. [**Preliminary Note on Chemoprophylaxis with Daraprim in a Rural Area**] *Ann. Soc. Belge de Méd. Trop.* 1952, Feb. 29, v. 32, No. 1, 91-9, 1 map.

The subjects of this study were 209 indigenous inhabitants of Kasongo-Mumena, a group of small villages situated north-east of Elizabethville, Belgian Congo. Between September 3 and November 19, 1951, Daraprim (pyrimethamine, "50-63") was administered at a dosage of 25 mgm. once weekly, irrespective of age. At the commencement of the experiment the parasite index among 77 children examined was 37.7 per cent. and among 106 adults 10.4 per cent. At its close the index among children had dropped to 1.5 per cent. and among adults to 1.2 per cent. The trial was carried out during the period of maximum malaria transmission (September to December), when the parasite index would normally be expected to show a progressive rise. The sporozoite index of *Anopheles funestus* in April 1951 was 7.1 per cent. (56 dissections). Two hundred and ninety dissections made during the period September to December 1951 yielded an index of 0.69 per cent. Transmission was thus very greatly reduced, though not completely interrupted.

The author concludes that Daraprim shows very great promise in the clinical prophylaxis of malaria. [For previous work on the use of Daraprim, see this *Bulletin*, 1952, v. 49, 663-66.]

G. Covell

BIRT, L. R. B. **The Campaign against Malaria on the Copperbelt of Northern Rhodesia.** *Proc. Transvaal Mine Med. Officers' Ass.* 1951, Oct., v. 31, No. 330, 41-5. Discussion 45-7.

On the Northern Rhodesian Copper Belt (28°E. 12°S.), a favourable climate at 4,500 feet above sea level with a 4-month season of rain averaging 60 inches per year is associated with favourable conditions for the breeding of *Anopheles funestus* and *A. gambiae*, the former in "dambos" or marshes and the latter in "sunny open pools of clean water with red earth suspended in them"; characteristically, these pools are largely man-made road ruts, borrow pits and the like associated with engineering projects.

In this virgin forest terrain mining townships were planned by engineers advised by consultant malariologists, so that site selection in relation to malaria received early attention. As mining operations developed, so did drainage of the surrounding country, and continued over many years. Europeans were housed in properly designed gauzed houses of burnt brick.

With the advent of medical officers on each mine, anti-malarial departments were formed with specially trained European supervisors and numerous African workers. Elimination of breeding areas thus became routine work, "dambos" being dealt with by the traditional method of central and contour drains; remaining waters were treated with mineral oils. Later (following the Park Ross example in Natal [this *Bulletin*, 1937, v. 34, 58]), Pyagra, the active principle of which was pyrethrum, was regularly applied in African dwellings to kill adult mosquitoes. Coincident with the routine work, African searchers for both larvae and imagines maintained a check on results, record-keeping was initiated and the diagnosis of malaria established by laboratory procedure; case histories in Europeans were carefully taken to determine the site of infection either within or outside the control area of several square miles.

In the earlier days three-quarters of the Europeans had *P. falciparum* infections each year and blackwater fever was common; suppressive quinine was used extensively; by 1939 the control methods and health education reduced incidence to about 240 per 1,000 per annum. In 1945 residual insecticides were introduced for all African dwellings. The success then attained can be illustrated by the European incidence of malaria on Nchanga, since falling as follows: 1944, 117.2 per 1,000 per annum; 1947, 23.33; 1950, 5.65; in 1950 the incidence of malaria contracted within the control area was 1.41 per 1,000. The struggle had lasted over 20 years. "Its success was primarily due to the great importance placed upon it by the mining companies."

[The author refrained from mentioning names in his discourse but it may be of interest to record that this magnificent work—to use a phrase from the ensuing discussion—was instigated and pursued by Chester BEATTY, then mining engineer, and Malcolm WATSON, the malariologist.]

R. Ford Tredre

MERCIER, S. La prophylaxie du paludisme au moyen des insecticides organiques de synthèse à Tananarive en 1950: incidences épidémiologiques et démographiques. [*Epidemiological and Demographic Results of Malaria Control by Residual Spraying in Tananarive in 1950*] *Rev. Paludisme et Méd. Trop.* 1952, Feb. 15, v. 10, No. 92, 21-31, 3 charts.

A residual spraying programme was started in Tananarive, Madagascar, in 1949 and continued in 1950, 180,000 inhabitants being protected. DDT was used chiefly as a wettable powder, but to a minor extent as a solution and emulsion [the dose per square metre and periodicity are not given]. The malaria mortality per 100,000 people decreased from 412 in 1948 to 118 in 1950, while the general mortality has sunk to 70 per cent. of the 1948 figure.

Examination of the deaths of infants and children shows that the greatest saving has been in the age-group 1-5 and not among infants. Comparable improvement has happened in the mortality rates of Europeans.

The application of residual insecticides completely removed the seasonal epidemic of malaria during the rainy season of 1949/50, and throughout the whole year the monthly number of deaths from malaria remained below the previous minimum figure. The curve of general mortality was similarly changed, reaching its lowest level during the previous malaria season.

G. Macdonald

JASWANT SINGH, PAL, R. & SHARMA, M. I. D. **Field Studies on the Comparative Effectiveness of D.D.T. and B.H.C. against Mosquitoes when applied separately and in Combination.** *Indian J. Malariology*. 1951, June, v. 5, No. 2, 235-48, 1 fig. [14 refs.]

Field studies on the comparative effectiveness of DDT suspensions and emulsions and BHC for anopheline mosquito control were carried out in 7 villages about 36 miles south of Delhi. The experiments began in July 1950 and continued until December, when cold weather reduced the mosquito population. The district was known to be malarious, *A. culicifacies* being the vector, and spleen rates ranged from 34 to 54 per cent.

The insecticides were used as residual house sprays, each dose and formulation being tried in a separate village, with the largest village left as an untreated control. The villages ranged from about 25 to 100 houses and 100 to 500 inhabitants. Most of the houses were poorly built, with mud-plastered walls and thatched roofs.

Regular weekly visits to catching stations in the villages were made after treatment and the following observations made: (a) numbers of mosquitoes in sprayed and unsprayed houses counted after spraying with pyrethrins; (b) numbers caught in Thomson type window traps; (c) 24-hour mortality of anophelines in the window traps; (d) chemical estimations of the residue of insecticide on the walls by the Alessandrini colorimetric test. Results may be summarized as follows: the figures represent the number of weeks after the application of the insecticides, at which the events tabled occurred.

Treatment		Mosquitoes approached 50 per cent. pre- treatment level (weeks)	Abrupt rise in sprayed unsprayed house mosquito ratio (weeks)	Mosquitoes in window traps survived 24 hrs. (weeks)	DDT residue fell below 10 mgm./ sq. ft. (Alessan- drini test) (weeks)
	Dose : mgm. per sq. ft.				
DDT suspension	50	6	4	3	6
DDT suspension	200	>6	8	4	9
DDT emulsion ...	50	4	3	4	4
DDT emulsion ...	200	7	8	4	6
γBHC suspension	10	>10	7	7	—
γBHC suspension	5	>10	8	—	—
+DDT suspension	25				

On the basis of these data the authors point out that the suspensions of DDT gave somewhat better results throughout than the emulsions. They state that "under local conditions there is little to choose between D.D.T. 50 mg. (applied

as suspension) and BHC 10 mg. gamma isomer per sq. ft.". [This does not seem to agree with the data recorded above, which indicate superiority of gamma BHC. In correspondence with one of the authors, the abstracter learnt that there was some doubt about the persistence of BHC after the 7th week because the natural mosquito population was declining at this time.]

Best results were obtained with a mixture of 5 mgm. γ BHC and 25 mgm. DDT per sq. ft., which were effective for about 2 months.

A noteworthy feature of this investigation was the very marked decline in DDT residue on the walls shown by chemical tests. *J. R. Busvine*

ANDREWS, J. M. **The Influence of the National Malaria Society on Malaria Eradication.** *Amer. J. Trop. Med. & Hyg.* 1952, Jan., v. 1, No. 1, 100-110. [33 refs.]

The National Malaria Society, which in 1941 succeeded the previous National Malaria Committee founded in 1916, is in the probably unique position of seeing its objectives fulfilled. The Committee was founded as a result of the efforts of HOFFMAN who advocated the total extermination of malaria from the United States. Members aimed at something less until after 1941 when, stimulated by the Brazilian extirpation of *Anopheles gambiae*, malaria eradication from the States was advocated, and in 1943 a formal resolution recommending it was passed, though the national programme with that objective was not authorized until 1947. In 1949 the Society convened a committee to report on standards of eradication [this *Bulletin*, 1951, v. 48, 1078], which has since been generally accepted. It is fulfilled in 5 States: Alabama, Florida, Georgia, Kentucky and Oklahoma, and seems likely of fulfilment elsewhere in the next few years. Because its objective was in sight the Society joined forces with the American Society of Tropical Medicine.

Future needs include much skilled supervision and observation of eradication. Work is complicated by the return of infected soldiers from Korea and the arrival of increasing numbers of migrant labourers from Mexico, all of whom provide fresh foci of infection. Much further research is needed into parasitology, chemotherapy, and particularly into insecticides with the aim of producing one which does not generate a resistance in insects. There is a wide field for malaria control specialists abroad for which there are insufficient qualified people, and the need for active concern in malaria as a disease remains.

[This article constitutes a very impressive record of the part played by the Society in the elimination of malaria from the United States as a serious problem.] *G. Macdonald*

MEXICO, D. F. SECRETARIA DE SALUBRIDAD Y ASISTENCIA. Memoria de la Campaña Nacional contra el Paludismo. [The National Campaign against Malaria] 188 pp., 76 figs., 21 maps & 9 graphs. 1949, May.

This report is a comprehensive account of the widespread distribution of malaria in Mexico, the pre-eminence of that disease as a cause of sickness and death in large tracts of the country, and the greatly increased efforts that have been made in recent years to combat the scourge.

A large part of the Republic of Mexico lies within the Neotropical Region. All the southern States and the States along both the Atlantic and Pacific sea-boards contain innumerable low-lying localities in which temperature, rainfall and humidity are very favourable for the perpetuation of endemic malaria. Here pernicious and fatal cases of malaria are frequent and here too the economic and social level of the rural population is low, and means of communication are very inadequate. The States in the north and centre of the

country are in the southern extremity of the Nearctic Region : these, too, are all afflicted with endemic malaria but cases are less numerous and of less gravity, *P. vivax* being the predominant species of parasite. For the country as a whole the average annual number of deaths ascribed directly to malaria during the years 1931-1946 was equivalent to a death-rate of 140.4 per 100,000.

Twenty-six species of *Anopheles* have been recorded in Mexico. Maps and brief notes indicate the geographical distribution of each. The most prevalent species are *Anopheles pseudopunctipennis*, abundant in both elevated and low-lying areas alike, and *A. albimanus* which flourishes especially in hot, moist, low-lying coastal areas. These are the two most important malaria vectors in Mexico. A subsidiary rôle in transmission in some areas is played by *A. quadrimaculatus*, *A. punctimacula* and *A. vestitipennis*.

The desultory small-scale anti-larval measures formerly in use have now been incorporated in a wide-scale national campaign against malaria. In 1948 DDT was being widely used in the campaign against both *Anopheles* and *Aedes* mosquitoes. All the States with high malaria morbidity rates are now using DDT as a residual insecticide. Certain of these successful anti-malaria campaigns are described in some detail.

A comprehensive malaria survey is the prelude to all new malaria control schemes. As examples malaria survey reports on Tampico and Villahermosa are reproduced. An illustrated account is given of large-scale drainage and reclamation engineering work that has been carried out in 8 localities. A chapter provides information about the anti-malaria drugs most in use and there is an interesting account of the successful cultivation of Cinchona in Mexico.

The volume is a record of praiseworthy achievement : it is profusely illustrated.

Norman White

CALERO ELORDUY, Carlos. La campaña contra el paludismo en el puerto de Veracruz. [The Anti-Malaria Campaign in the Port of Veracruz] 188 pp., 27 graphs, 24 figs., 3 plans & 1 folding coloured map. 1950. [Veracruz : Comité de Lucha Antipalúdica.]

This is a description of work undertaken in the Port of Veracruz during the years 1947 to 1950 which had as its objective the eradication of malaria from that town.

An introductory chapter summarizes the eventful history of the town from its foundation in 1519. Veracruz is situated in latitude 19° 12' N. and has a hot moist climate. Mean temperatures in the different seasons of the year are winter, 21.9°C.; spring, 26°C.; summer 27.3°C.; autumn 24.7°C. The annual rainfall is 1,621 mm. most of which falls from June to September. The mean annual relative humidity is 82 per cent.

In 1950 the population of the town approximated 100,000. The lowest general mortality rate ever recorded was 14.94 per thousand in 1950 ; the highest in recent years was 28.05 in 1942. Infant mortality rates in recent years have varied from 96.72 in 1949 to 149.89 in 1944.

From 1794 to 1910 epidemic outbreaks of yellow fever of varying intensity were of frequent occurrence in Veracruz. Then followed 10 years of freedom from that disease. In 1920 there was a final epidemic since when no indigenous case has been reported. The suppression of yellow fever can be credited to the energetic anti-mosquito campaign inaugurated in 1920 with the aid and under the direction of the International Health Division of the Rockefeller Foundation. An extension of anti-larval work in subsequent years caused a noteworthy reduction in malaria morbidity and mortality, but the disease persisted.

In 1947 a new Antimalaria Committee was set up. The work it started in May of that year is fully described in this well documented and illustrated report. The result of this enterprise has been the practical elimination of malaria from the town. In 1950 not a single death was attributed to malaria and there were only 34 indigenous cases recorded. DDT has proved of great service in the campaign but should not be accorded all the credit for the results achieved. Throughout the campaign there has been most fruitful collaboration between official action and private enterprise.

Norman White

SERGEANT, Ed. & PONCET, A. De la longue durée de l'infection latente métacritique dans le paludisme expérimental à *Plasmodium berghei* du Mériion nord-africain. [**Protracted Latent Infection with *Plasmodium berghei* in the North African Gerbil**] *Arch. Inst. Pasteur d'Algérie*. 1951, Dec., v. 29, No. 4, 269-72, 3 figs.

In the North African gerbil (*Meriones shawi*) experimental infection with *Plasmodium berghei* is transient, with parasites appearing in the peripheral blood for only a few days [this *Bulletin*, 1951, v. 48, 445]. In order to ascertain whether a latent infection was still present in these animals, the entire blood of 2 gerbils was removed 11 and 16 months respectively after the initial inoculation, and inoculated into 2 series of white mice. Those injected from one of the donors acquired a heavy infection which terminated fatally, while those injected from the other gerbil did not become infected. In the former gerbil, therefore, a latent infection persisted during one-third of its lifetime (about 3 years), while in the latter it disappeared when the animal reached middle age.

C. A. Hoare

SERGEANT, Ed. & PONCET, A. De la "résistance innée" du cobaye au paludisme des rongeurs à *Plasmodium berghei*. [**"Innate Resistance" of Guinea-pigs to Infection with *Plasmodium berghei***] *Arch. Inst. Pasteur d'Algérie*. 1951, Dec., v. 29, No. 4, 273-6.

Since all previous attempts to infect guinea-pigs with *Plasmodium berghei* have failed, the authors set out to determine whether the apparent refractoriness of these rodents was due to their natural resistance to infection, or to premunition conferred by a latent infection. One guinea-pig, inoculated with the blood of an infected mouse, proved to be naturally resistant to infection, since 2 subinoculations of its blood (on the last occasion the entire content) failed to infect mice. In two other guinea-pigs the entire blood was removed 2 and 4 days respectively after inoculation of infected mouse blood, and subinoculated into 21 and 26 mice respectively. In the former series 5 mice became infected, in the latter none. It was thus shown that *P. berghei* disappeared from the blood of the infected guinea-pigs between the 2nd and 4th days after they had been inoculated.

C. A. Hoare

JONES, E. S., MAEGRAITH, B. G. & SCULTHORPE, H. H. **The Constant-Volume (Warburg) Manometer for Blood-Oxygen Determination.** *Ann. Trop. Med. & Parasit.* 1951, Dec., v. 45, Nos. 3/4, 223-6, 1 diagram. [16 refs.]

It is known that determination of oxygen capacity of the blood by the ferricyanide method of Haldane gives low results because of the occurrence of a slow oxidation of protein or lipid present. COURTICE and DOUGLAS (*J. Physiol.*, 1947, v. 105, 345) were able to eliminate this source of error by employing a borate buffer of pH 10 instead of ammonia or sodium bicarbonate, as well as by reducing the concentration of the ferricyanide solution and by filling the gas space in the reaction flask with CO₂-free air. The present authors

have used the Warburg apparatus for determinations of blood-gases in several samples at a time. A detailed description of their technique based on that of the above two authors is given. By using the results obtained, dissociation curves for various normal and pathological bloods have been constructed and compared favourably with those obtained by other methods. J. D. Fulton

JONES, E. S., MAEGRAITH, B. G. & SCULTHORPE, H. H. **Pathological Processes in Disease. III.—The Oxygen Uptake of Blood from Albino Rats infected with *Plasmodium berghei*.** *Ann. Trop. Med. & Parasit.* 1951, Dec., v. 45, Nos. 3/4, 244–52, 6 figs. [20 refs.]

In continuation of their studies on the pathological processes in malaria the authors have investigated the utilization of oxygen by rat blood infected with *P. berghei*. Their aim was to find out whether increased utilization of O_2 by infected blood is likely to affect the supply of this gas to the host tissues. A difficulty experienced in work of this nature is that the oxygen requirements of host erythrocyte and parasite cannot be followed separately under the conditions present during an infection. Respiration studies on the host cell alone and of parasites freed from the erythrocyte have, however, been made in the presence of different substrates [this *Bulletin*, 1938, v. 35, 709; 1940, v. 37, 509; 1946, v. 43, 824, 1116]. In the present study heparinized blood from albino rats was used and the oxygen uptake determined in a Warburg apparatus in the presence or absence of glucose after equilibration and dilution with phosphate buffer. It was found that the presence of *P. berghei* greatly increased the oxygen uptake of blood, which was of linear character with time. Cyanide proved satisfactory in limiting the uptake of oxygen when the oxygen capacity was being determined in normal or parasitized blood. When obtaining data for dissociation curves in parasitized blood a complication was caused by the loss of oxygen from oxyhaemoglobin and was overcome by the use of an “anaerobic” technique which is described. The oxygen uptake of parasitized blood under different tensions of this gas was also investigated, to allow deductions to be made on the quantitative importance of this uptake for the organism as a whole, or for certain tissues. The amount used by parasitized blood varied but little with tension and it was considered improbable that it affected the host directly. J. D. Fulton

BLACKWATER FEVER

DE, S. N., SENGUPTA, K. P., BHATTACHARYYA, K. & KONAR, N. R. **Observations on the Mechanism of Haemolysis in Blackwater Fever.** *J. Indian Med. Ass.* 1951, Dec., v. 21, No. 3, 95–8. [26 refs.]

Samples of blood were taken from a case of blackwater fever on the third day after the beginning of haemoglobinuria. The following examinations were made:—

(1) To detect alteration in the red blood cells—(a) total red cell, (b) haemoglobin, (c) packed cell volume, (d) mean corpuscular volume, (e) mean red cell diameter (average of 500 cells), (f) mean corpuscular average thickness, (g) fragility of the erythrocytes washed in normal saline to hypotonic saline and to mechanical trauma.

(2) To demonstrate any possible evidence of antigen-antibody reaction in the serum—(a) acid cold haemolysin, (b) cold agglutinin, (c) Donath-Landsteiner reactions, (d) determination of complement titre in the serum.

The result showed some degree of microcytosis, some reduction in complement and a positive reaction for cold agglutinins at a serum dilution of 1/250. There was gross evidence of haemoglobinaemia and there were no malaria parasites.

The significance of the cold agglutination is discussed and the authors suggest that despite the low titre this reaction supports the auto-antigen-antibody haemolysis hypothesis.

[On admission the patient received alkaline mixture every 6 hours, vitamin C and paludrine (proguanil) 100 mgm. t.d.s. The last was discontinued on the day the blood samples were taken. The patient then received antihistaminic drug, adrenal cortical extract, nikethamide, sodium acetate and 340 cc. blood. The effect of this treatment on the blood is not considered by the authors.]

B. G. Maegraith

FUKUDA, T. [**Ocular Lesions in Blackwater Fever**] *Nichidai Igaku Zasshi* (*Nippon Univ. Med. J.*) 1949, Nov., v. 8, No. 4, 141-50, 2 figs. on pl. [In Japanese.] [Abstract prepared from English translation supplied by author.]

This article is based on the observation of 63 cases of blackwater fever which were studied from the onset of the disease and in its different stages.

Of the 63 patients, 10 died, 34 were serious, 23 moderately severe and 6 were mild cases of the disease.

In the conjunctiva jaundice and anaemia were observed and in 4 cases Bitot's spots were found. In the cornea and iris no lesions were seen although herpes and keratitis were observed in malaria. In 6 cases *muscae volitantes* were present. The fundal changes ran parallel with the anaemia and were classified into 4 stages. The first stage was that of anaemia between the 1st and 7th days in which there were no changes to be seen in the eyes. The second stage, between the 5th and 10th days, coincided with the rapid reduction of the red cells and ceased when the number of them became stable. The retinal reaction was weakened and venous tortuosity was noticeable but no further change was recognized. In the 3rd stage, between the 7th and 21st days when the anaemia was profound, the typical retinitis of anaemia took place. In the 4th stage, or stage of convalescence, the retina returned to normal and in most cases normal vision was almost always recovered. In 18 cases which showed a central scotoma, 11 were due to haemorrhage in the region of the macula and 7 to oedema. Retinal haemorrhages were frequent between the 3rd and 17th days and out of 63 cases 26 showed haemorrhages, most of which were of small size. The haemorrhages occurred when the red cells fell below 3 million per cmm. and the amount of haemoglobin was under 40 per cent., but cases of profound anaemia were seen in which there were no retinal haemorrhages.

In contrast to malaria, inflammatory ocular lesions were absent. Extensive degrees of fundal haemorrhage were occasionally seen in malaria, but this was absent in blackwater fever.

Blackwater fever is very rare in Japan. The author observed a few cases in Formosa and his observations are based on the cases he saw in Rabaul, New Britain.

The article is illustrated by two fundus photographs. E. O'G. Kirwan

TRYPANOSOMIASIS

PERTTUNEN, V. **Experiments on the Humidity Reactions of some Tsetse Fly Species (Dipt., Muscidae).** *Ann. Entom. Fennici.* 1950, v. 16, No. 2, 41-4.

Experiments are described in which tsetse flies were offered a choice of atmospheric humidity. The apparatus provided either a humidity gradient, or a sharply defined choice. Temperature, which was uniform in any one experiment, was always between 17° and 22°C. [This is surely low for tsetse flies and may have resulted in some inertia.]

The flies were newly emerged, and unfed : as the experiments lasted several days, they must have undergone progressive and serious desiccation and starvation. It is probably for this reason that they tended to move towards the damper end of the scale : for instance *G. palpalis* nearly all accumulated between 27 and 50 per cent. relative humidity, and most between 35 and 50, on the first day : in successive days the majority moved towards the saturated air, 58 per cent. being at 80-100 on the sixth day, and all the surviving flies on the seventh. *Glossina morsitans* behaved in a similar way, though in a less clear-cut manner.

When a clear alternative was provided, it was found that *G. morsitans* could not detect the difference between 46 and 73 per cent. relative humidity.

P. A. Buxton

NASH, T. A. M. **Some Observations on Resting Tsetse-Fly Populations, and Evidence that *Glossina medicorum* is a Carrier of Trypanosomes.** *Bull. Entom. Res.* 1952, Mar., v. 43, Pt. 1, 33-42.

The author continues his studies on tsetse at rest. He points out that most methods are "bait techniques", and that they enumerate the flies which are active. If one can find tsetse at rest one is studying a different part of the population, or a species which is not attracted to man.

Considerable numbers of *Glossina medicorum* and *fuscus* (with 45 per cent. of females) have again been taken at rest on trunks of saplings in a place in Southern Nigeria, though very few come to the human being. Some individual fly-boys are much more efficient than others at detecting resting fly, a fatiguing operation.

In 50 *G. medicorum* dissected, trypanosomes both of the *vivax* and *congolense* groups were found.

The same method of searching was applied also to *G. morsitans* in *Isoberlinia doka* woodland, near Kaduna. Flies at rest have been seen as high as 14 feet from the ground : they are generally underneath horizontal boughs. A considerable sample of flies found resting in the vicinity of cattle showed a high percentage of gorged individuals, and 40 per cent. of 826 flies were female : in a similar sample caught when attracted to man 15 per cent. were gorged and the insects were empty and hungry ; the female percentage was 21.

Many notes are collected on the resting attitude and position in relation to the hunger stage of the fly.

P. A. Buxton

DE FREITAS, J. L. P., NETO, M. R., NESTI, A., DE ANDRADE e SILVA, U. & LIMA, A. B. Resultados de um inquérito sobre moléstia de Chagas realizado no município de São Carlos (Estado de São Paulo, Brasil) e arredores. [Survey of Chagas's Disease in São Carlos and its Environs (São Paulo, Brazil)] *Folia Clin. et Biol.* S. Paulo. 1950, Dec., v. 16, No. 2, 150-57, 1 fig. English summary.

LASZLO, Herta P. Composição química da "substância solúvel e específica" do *Trypanosoma (Schizotrypanum) cruzi* e da *Leishmania brasiliensis*, extraída pelo método de Fuller. Novo meio de cultura para o crescimento desses flagelados. [Chemical Composition of Soluble Specific Substance of *T. cruzi* and *Leishmania brasiliensis* Extracted by Fuller's Method. New Culture Medium for growing these Flagellates] *Brasil-Médico*. 1952, Feb. 16 & 23, v. 66, Nos. 7/8, 101-6. [14 refs.] English summary.

DE FREITAS, J. L. P. Observações sobre o tempo ótimo para exame de Triatomídeos empregados em xenodiagnóstico. [Optimum Time for Examination of Triatomids Used for Xenodiagnosis] *Folia Clin. et Biol.* S. Paulo. 1950, Dec., v. 16, No. 2, 180-85. English summary.

DE FREITAS, J. L. P. Reação de fixação do complemento para diagnóstico da moléstia de Chagas pela técnica quantitativa. [Quantitative Complement-Fixation Test in the Diagnosis of Chagas's Disease] *Folia Clin. et Biol.* S. Paulo. 1950, Dec., v. 16, No. 2, 192-8. English summary.

See this *Bulletin*, 1949, v. 46, 1129.

GROOT, H., RENJIFO, S. & URIBE, C. *Trypanosoma ariarii*, n. sp., from Man, found in Colombia. *Amer. J. Trop. Med.* 1951, Nov., v. 31, No. 6, 673-91, 1 text fig. & 3 pls. [16 refs.]

In the Ariari River valley, near Bogotá, Colombia, the authors discovered a trypanosome infection in 67 out of 183 persons examined by the cultural method. Cultures were obtained in Geiman's medium and maintained at 15°C. or 28°C., the lower temperature being more suitable for prolonged maintenance of the strains.

The trypanosomes developed readily in *Rhodnius prolixus* after these bugs had fed on infected human beings. In the bugs the trypanosomes gave rise to leishmanial, crithidial and trypanosome forms. Similar flagellates—which were indistinguishable from TEJERA's *T. rangeli* in this bug—were seen in naturally infected *R. prolixus* of the same area, where these insects are common.

Unsuccessful attempts were made to infect various animals by inoculation of blood from infected human beings and of the intestinal contents of infected bugs. However, positive results were obtained by inoculation of cultures into young white mice, opossums, a macaque monkey and 4 human volunteers. In the volunteers trypanosomes could be recovered by culture for periods from 3 to 15 months, but they were not seen in the blood, except in one of them who had a virus infection which was treated by chloramphenicol. During and after treatment trypanosomes were detectable in his blood. During the period of observation, the infections in the volunteers followed a symptomless course.

The blood forms of the trypanosome, as seen in the mammalian (including human) hosts, are of the *lewisi* type: the length of the body (with flagellum) varies from 26.32 to 36 μ , with a mean of about 31 μ ; both ends of the body are pointed, and there is a free flagellum 9.5 μ long; the small kinetoplast occupies a subterminal position. Reproduction takes place in the blood, by binary fission. Unlike *T. cruzi*, this trypanosome does not multiply in the leishmanial stage in the tissues.

Natural infections with this trypanosome were seen in a dog and in a captive *Cebus* monkey: it is therefore conceivable that dogs might act as reservoir hosts.

In a number of tables, detailed measurements are given of *T. ariarii* in the blood and in the bug, as well as the comparative characteristics of this trypanosome, *T. cruzi* and *T. rangeli*.

There can be no doubt that this trypanosome differs considerably from *T. cruzi*. However, its relationship to *T. rangeli* is not so clear. The last name was given by a number of South American workers to human trypanosomes which, in experimentally infected *Rhodnius prolixus*, gave rise to flagellates similar to those originally described by TEJERA in naturally infected bugs of this species under the name *T.* (or *Crithidia*) *rangeli* [this *Bulletin*, 1949, v. 46, 923; 1950, v. 47, 723]. But since the developmental stages of a number of mammalian trypanosomes in this bug are similar, "It is not possible to conclude . . . that . . . they belong—for that reason only—to the same species". Moreover, "So far, nobody has been able to infect man or other vertebrates with the so-called *T. rangeli* from naturally infected *R. prolixus*." In view of these facts the authors—though not denying the close affinities between the trypanosome described by them and *T. rangeli*—proposed a new name, *Trypanosome ariarii* sp. n., for the human trypanosome found in Colombia. [The recent discovery of a new form of human trypanosomiasis due to *T. rangeli* or *T. ariarii* or both, resembling *T. lewisi*, might help to throw light on the mysterious infection with a *lewisii*-like trypanosome reported from a Malayan child 21 years ago (this *Bulletin*, 1933, v. 30, 440).]

C. A. Hoare

LEISHMANIASIS

SOONG, Han-ying & HO, E. A. **Screening Test for Therapeutic Effect of Anti-Kala-Azar Drugs. (Preliminary Report.)** *Chinese Med. J.* Peking. 1952, Jan.-Feb., v. 70, Nos. 1/2, 75-6.

The authors refer to the methods of evaluating antimony compounds in leishmaniasis described by GOODWIN [this *Bulletin*, 1945, v. 42, 262; 1946, v. 43, 319] and VAN DYKE and GELLHORN [*ibid.*, 1947, v. 44, 512]. The present authors noted that a quicker result could be obtained by treating Chinese hamsters subcutaneously immediately after inoculation with infected spleen material and observing the effect in the development of infection.

They treated 3 groups of 20 hamsters each subcutaneously with $\frac{1}{2}$ LD₅₀ of the drug in one injection, with $\frac{1}{8}$ LD₅₀ daily for 3 days and with the same dose daily for 6 days, respectively. In each case, pentostam, urea stibamine and neoarsphenamine were tested. All hamsters were examined by spleen biopsy after 5 and 11 weeks. Twenty infected hamsters served as untreated controls.

The results are shown in a table, from which it is seen that the first two drugs had a marked inhibitory effect on leishmaniae, the effect being similar in both, *i.e.*, it increased with the dose and was transient: neoarsphenamine had little or no effect. For example, irrespective of the dosage used, only 1 animal showed the presence of LD bodies in spleen smear after 5 weeks, when pentostam and urea stibamine were used: in the case of neoarsphenamine, 12 to 15 animals in each group were positive for LD bodies. H. J. O'D. Burke-Gaffney

DEL PONTE, E. Consideraciones sobre la epidemiología de la leishmaniasis tegumentaria en la Argentina. [The Epidemiology of Cutaneous Leishmaniasis in the Argentine] *Bol. Oficina Sanitaria Panamericana*. 1952, Mar., v. 32, No. 3, 223-31. [20 refs.]

The author represents the chain of human infection of cutaneous leishmaniasis by the following formula:—

$$V.E. + A.F. + P.H. - D.A. + H.S. = \text{Leishmaniasis}$$

by which he implies that for spread of the disease it is necessary to have the

appropriate vector (*vector epidemiológico*) in a favourable site (*ambiente favorable*), a human case as source of infection (*portado humano de gérmenes*) or an animal reservoir host (*depositorio animal*) and a human susceptible subject, a non-immune (*hombre sensible*). The author has a few words to say on each of these. The vectors are species of *Phlebotomus*, *P. migonei*, *P. intermedius*, *P. whitmani*, possibly *P. fischeri*, and, in Peru a new psychodid vector, *Warileya phlebotomanica*. Favourable site depends on proper plant food for the male *Phlebotomus* and animals for the females, guinea pigs, dogs, horses. The human patient is naturally one with open sores. In some parts of the forest region of Paraguay they are numerous, whereas in Misiones they are few and the disease is, consequently, rife or rare accordingly. The persons attacked are chiefly woodcutters or those engaged in railroad construction close to woods, or those working in shaded well wooded regions, as these are favourite haunts of the vectors. Possible reservoir hosts are the Golden agouti (*Dasyprocta aguti*), dogs, horses and, but less likely, birds and reptiles. Finally, the susceptibles are non-immune workers introduced from without. H. Harold Scott

FEVERS OF THE TYPHUS GROUP

LÖFFLER, W. & MOOSER, H. Ein weiterer Fall von Brill-Zinsserscher Krankheit in Zürich. (Später Rückfall bei klassischem Fleckfieber.) [Further Cases of Brill's Disease in Zurich] *Schweiz. med. Woch.* 1952, May 3, v. 82, No. 18, 493-5, 1 chart. [21 refs.]

SIGEL, M. M., WEISS, L. B., BLUMBERG, N. & DOANE, J. C. Survey of Epidemic Typhus Antibody Levels in Bloods of Individuals born in Eastern and Central Europe and the United States. *Amer. J. Med. Sci.* 1952, Apr., v. 223, No. 4, 429-32.

Among 69 persons who were born in East Europe, but had lived in the U.S.A. for the past 28-53 years, 12 gave positive complement-fixation reactions with epidemic-typhus antigen. Among 80 persons who had lived in the U.S.A. from birth but were otherwise comparable none gave a positive reaction. The positive reactions are regarded as consistent with the survival of the typhus rickettsiae for many years.

Tests made with "washed rickettsiae" gave more specific results than those made with the cheaper "soluble" antigens, but the latter were quite satisfactory for general use. John W. D. Megaw

VERÁSTEGUI CORDERO, H. Contribución al estudio del Tifus exantemático en Cerro de Pasco. [Observations on Exanthematic Typhus in Cerro de Pasco] *Actualid. Med. Peru.* 1951, May-June, v. 17, Nos. 1/2, 3-5, 1 chart.

WEYER, F. Die experimentelle Infektion der Filzlaus *Phthirus pubis* L. mit *Rickettsia prowazeki* und *R. quintana*. [Experimental Infection of the Crab Louse, *Phthirus pubis*, with *Rickettsia prowazeki* and *R. quintana*] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1952, Feb., v. 3, No. 3, 302-9, 5 figs. [17 refs.]

Both *Rickettsia prowazeki* and *R. quintana* multiplied in crab lice inoculated intrarectally by Weigl's method; the former grew rapidly inside the cells of the gut and were lethal to the lice; the latter remained extracellular.

Although the crab lice are potential vectors of louse-borne typhus and trench fever their habit of remaining persistently attached to the same host deprives them of any great significance in transmitting the diseases.

Head lice were found as readily susceptible as body lice to infection with the above rickettsiae.

John W. D. Megaw

KRYŃSKI, S., KUČHTA, A. & BECLA, E. **Research on the Nature of the Noxious Action of Guinea-Pig Blood on the Body-Louse.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1952, v. 4, No. 1, 104-7. [Also in Polish 97-100 & in Russian 100-104.]

The cause of death of lice "after several scores of hours" among the insects fed on guineapigs was found to be mechanical injury to the intestines resulting from the crystallization of haemoglobin released during the haemolysis of the ingested blood. The intestines were found to be packed with the crystals whose sharp cutting edges damaged the epithelial cells.

John W. D. Megaw

KRYŃSKI, S. **Influence exerted by the Feeder on the Course of Rickettsia prowazeki Infection in Lice.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1952, v. 4, No. 1, 47-9. [Also in Polish 41-3 & in Russian 44-7.]

The author has found that persons engaged in feeding infected lice employed in the preparation of Weigl's vaccine are less effective donors of blood meals when their haemoglobin levels are low, or when their state of nutrition is below par as estimated by the ratio between body weight and height. Such factors as age, sex, previous history of typhus fever, duration of feeding and numbers of lice fed in each month had no appreciable influence.

The experiments were conducted in 1945-46 when the author was in charge of the production of Weigl's vaccine.

John W. D. Megaw

SILVA-GOYTIA, R. **Serología del Tifo exantemático. [Serology of Epidemic Typhus]** *Medicina.* Mexico. 1952, Apr. 10, v. 32, No. 649, 145-9. [47 refs.]

A review of the literature.

BECKER, H. W. & KAETHER, H. **Zur Frage des Fleckfieberrezidivs (Brill'sche Krankheit). [The Question of Relapses in Typhus Fever (Brill's Disease)]** *Med. Klin.* 1952, May 16, v. 47, No. 20, 674-7. [23 refs.]

KARP, Adele & SNYDER, J. C. **In Vitro Effect of Aureomycin, Terramycin, and Chloramphenicol on Typhus Rickettsiae.** *Proc. Soc. Exper. Biol. & Med.* 1952, Feb., v. 79, No. 2, 216-19, 2 figs.

Aureomycin and terramycin in concentrations of 100-300 mgm. per ml. has a marked inhibitory effect on the respiration of murine and epidemic typhus rickettsiae *in vitro*. Chloramphenicol in these concentrations has only a slight inhibitory effect, equivalent to that produced by concentrations of 30 mgm. per ml. of the other two drugs.

The inhibitory effect is correlated with a diminution of the toxicity and infectivity of the suspensions and is regarded as showing that aureomycin and terramycin have a rickettsiocidal effect *in vitro*, and presumably that chloramphenicol has little or no action of this kind.

The authors do not discuss the possible bearing of these findings on the relative therapeutic effectiveness of the drugs.

John W. D. Megaw

SUZUKI, K. **Studies on the Toxicity of *Rickettsia mooseri* for Mice especially on the Effects of Enzymatic Inhibitor and Accelerator.** *Japanese J. Exper. Med.* 1951, Oct., v. 21, No. 3, 291-8, 4 figs. [12 refs.]

By freezing and thawing and by supersonic irradiation a toxoid-like substance was extracted from the cells of *Rickettsia mooseri* but no toxic substance could be extracted. The enzymatic inhibitors, potassium cyanide and iodacetic acid, when kept in contact with the rickettsiae for a considerable time, caused a remarkable diminution in the toxicity of the rickettsiae. Cysteine, on the other hand, at suitable concentration, increased the toxicity and counteracted the action of iodacetic acid. All 3 chemicals, however, had to be kept in contact with the organisms "for some time" otherwise they had no action on toxicity, and tested *in vivo* they produced no change in the toxicity. The author suggests that the term "rickettsial toxicity" seems preferable to "rickettsial toxin".

John W. D. Megaw

HARRISON, J. L. & AUDY, J. R. **Hosts of the Mite Vector of Scrub Typhus. I.—A Check-List of the Recorded Hosts.** *Ann. Trop. Med. & Parasit.* 1951, Dec., v. 45, Nos. 3/4, 171-85. [48 refs.]

The authors describe this paper as an attempt to collect and analyse the available information on the hosts of the mite vectors of scrub typhus. A formidable list is given of 87 species of mammals and birds on which *Trombicula akamushi* and *T. deliensis* have been found; the list includes 43 rodents of which 32 are murids. Another list is given of 20 rodents, 2 insectivores, and 1 marsupial, that have been found infected.

The collection of this information was regarded as a necessary preliminary to the studies of the ecology of the vector mites and their hosts, which are being carried out by the Scrub Typhus Research Unit at Kuala Lumpur.

The paper is not a mere compilation; the authors discuss the part played by the hosts in the distribution of the vector mites, which they regard as belonging to a single species or species-complex, *T. akamushi*. In compiling the list of hosts the authors often found that the published records failed to supply information needed on certain points; they now give a list of suggestions which will enable future observers to make their records more informative. These suggestions will be found helpful by workers who make surveys of the vectors of other diseases.

John W. D. Megaw

HARRISON, J. L. & AUDY, J. R. **Hosts of the Mite Vector of Scrub Typhus. II.—An Analysis of the List of Recorded Hosts.** *Ann. Trop. Med. & Parasit.* 1951, Dec., v. 45, Nos. 3/4, 186-94, 2 figs. [24 refs.]

This is a critical analysis of the part played by the hosts listed in the preceding paper. The chief conclusion reached is that the principal hosts of *Trombicula akamushi* are primarily various field-dwelling species of *Rattus rattus*, supported sometimes, or even replaced, by a few other species of rodents, insectivores, rat-like marsupials, or birds.

The centre of dispersal of *R. rattus* appears to be Malaysia, and the conditions necessary for the abundant propagation of this species are created by man when he removes the forest canopy and grows food crops, thereby exacerbating the original enzootic infection with *Rickettsia tsutsugamushi* which exists in the primitive jungle where *R. rattus* is found in small numbers. Medical entomologists will find a wealth of information in this interesting paper.

John W. D. Megaw

KORSHUNOVA, O. S. & PETROVA-PIONTKOVSKAYA, S. P. [On the Vector of Marseilles Fever] *Dokl. Akad. Nauk SSSR* (N.S.) Moscow. 1949, v. 68, No. 6, 1151-3, 1 graph. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1952, Mar., v. 40, Pt. 3, 47-8.]

Several strains of the rickettsia of Marseilles fever were isolated in 1946-47 from adults of *Rhipicephalus sanguineus* (Latr.) resulting from nymphs taken on dogs in the Crimea. In experiments, a batch of such adults was fed on a guineapig, which developed fever six days later, the engorged females oviposited after being kept for 3-5 days, and when the resulting larvae and nymphs were fed on guineapigs, both of the latter subsequently developed fever. Symptoms typical of Marseilles fever were obtained when brain from the second animal was injected into two healthy guineapigs and further passages made. Numerous rickettsiae were found in smears of the salivary glands, stomach and sex organs of adult females from the infected nymphs, but none in those of the males.

In further tests, the rickettsia was found to be pathogenic to mice and rabbits, but not to white rats or *Sigmodon hispidus*. The mice were infected intranasally by means of a suspension of the ticks or of the organs of guineapigs used for serial passages, and the rabbits by intratesticular injection of a suspension of guineapig organs.

PHILIP, C. B. **Tick Transmission of Indian Tick Typhus and some Related Rickettsioses.** *Exper. Parasit.* New York. 1952, Mar., v. 1, No. 2, 129-42. [24 refs.]

The author describes the recovery of a strain of tick-typhus rickettsia recovered from a pool of 5 ticks (*Rhipicephalus sanguineus*) found in Srinagar, Kashmir, in the house of a person who had been attacked during the previous year by a typhus-like fever following a bite by a tick. The strain has been maintained for more than 50 passages through guineapigs without apparent loss of virulence. The originally inoculated guineapig had scrotal swelling but none of the experimental guineapigs died and some of them had inapparent attacks which caused immunity. The apparent relationship to *fièvre boutonneuse* has already been reported by the author with L. E. HUGHES, K. N. A. RAO and S. L. KALRA in a preliminary note published in the account of the Fifth International Congress for Microbiology, Rio de Janeiro, 1950, p. 115. Infection was transmitted to guineapigs by the bites of larvae, nymphs and adults of *R. sanguineus* infected in previous stages by biting infected guineapigs, one of which when challenged 55 days after inoculation was found immune to a strain of *boutonneuse* fever and three others were immune to a virulent strain of Rocky Mountain spotted fever rickettsia.

Attempts to transmit infection by the bites of *Dermacentor andersoni* failed as also did attempts to transmit *boutonneuse* fever and South-African tick bite fever by this tick, which, therefore, is not considered to be so effective in transmitting these diseases as is *R. sanguineus*. Some enigmatic results were, however, observed in transmission experiments with both species of ticks.

The author concludes that the present study "completes the evidence of the presence of tick-borne infection in India and justifies Megaw's title of 'Indian tick typhus'". [The reference is to a paper by the reviewer, on Indian tick typhus (this *Bulletin*, 1925, v. 22, 518). The title of this paper might suggest that an announcement was made of the discovery of a new disease, but there was no intention to make any such claim; in fact ever since making a tentative proposal in 1921 that all the typhus-like fevers should provisionally be classified in the "typhus group" and named in accordance with their transmitting vectors the reviewer has consistently advocated the desirability of regarding

all the tick-borne typhus fevers as varieties of one disease, "tick typhus", till any of them should be shown to be specifically different from the others. Modern studies, including those of the author of the present paper, suggest that the tick-borne typhus-like fevers are as closely related to each other in their antigenic and other features as are the varieties of mite-borne scrub typhus. A belated apology is due for the wording of the old paper which would more suitably have been named "tick typhus in India".]

John W. D. Megaw

BOW, M. R. & BROWN, J. H. **Rocky Mountain Spotted Fever in Alberta, 1935-1950.** *Canadian J. Pub. Health.* 1952, Mar., v. 43, No. 3, 109-15, 3 figs. [29 refs.]

From the Canadian Province of Alberta, which lies north of Montana, U.S.A., 9 "accepted" and 4 probable cases of Rocky Mountain spotted fever have been reported during the years 1935-1950. All the cases occurred in places where the tick *Dermacentor andersoni* is known to occur, and all the patients gave a history of tick bite. Five of the 9 accepted cases were fatal; one of the patients who died was a young man, the other 4 were 61 and 82 years old or "elderly". Only 5 of the 13 patients were less than 55 years old; this age distribution suggests that a considerable number of cases may have escaped detection. The seasonal distribution of all the 9 cases in which the month of occurrence is mentioned was May to July. *Rickettsiae* were recovered from ticks in every area in which cases occurred.

John W. D. Megaw

WIESMANN, E. Die Q-fever-Forschung in der Schweiz in den Jahren 1947-1951. [**Q Fever Research in Switzerland in 1947-1951**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1952, Feb., v. 3, No. 3, 297-301. [22 refs.]

This is a summary of 20 articles on Q fever in Switzerland, published since early in 1947 when the disease was first detected in that country.

Between August, 1947, and November, 1951, 1,080 cases have been diagnosed by the complement-fixation test at the St. Gallen Institute of Bacteriology; numerous other cases have been found positive by MOOSER in Zurich. The disease is endemic all over Switzerland and the neighbouring territories. Its features are similar to those described by observers in other countries. An outbreak in the Engadine Valley in 1950 occurred at the same time as a number of cases of infectious abortion among sheep.

John W. D. Megaw

PAVILANIS, V., LEPINE, P. & MORISSET, N. **The Presence of Q Fever Complement Fixing Antibodies in Sera of Inhabitants of the Province of Quebec.** *Canadian Med. Ass. J.* 1952, Apr., v. 66, No. 4, 333-4.

"1. The presence of a significant level of Q fever antibodies in the sera examined suggests that this disease is present in the Province of Quebec.

"2. 4.6% of the residents of Quebec examined had Q fever antibodies with a high titre (1:32 and more) and 10.5% (considered as doubtful) showed titres of 1:8 and 1:16.

"3. A greater number of positive sera was found in children than in adults. This points to infection at an early age."

LENNETTE, E. H., CLARK, W. H., ABINANTI, Margery M., BRUNETTI, O. & COVERT, J. M. **Q Fever Studies. XIII. The Effect of Pasteurization on *Coxiella burneti* in Naturally Infected Milk.** *Amer. J. Hyg.* 1952, Mar., v. 55, No. 2, 246-53.

The object of these studies was to determine the frequency with which *Coxiella* [*Rickettsia*] *burneti* in milk survives pasteurization in the conditions

prevailing in commercial practice. In one out of 35 tests milk remained infective for guineapigs after treatment by the "holding method" (143°F. for 30 minutes), but the pasteurization in this case may not have been complete as the phosphatase test was weakly positive. In 2 out of 42 tests milk remained infective after treatment by the "high-temperature short-time method" (160°F. for 15 seconds). It is suggested that a larger number of cases of survival of the organisms might have occurred but for the fact that in most of the tests higher temperatures or longer periods, or both, were employed than are required by the California regulations.

John W. D. Megaw

LENNETTE, E. H., HOLMES, M. A. & ABINANTI, F. R. **Q Fever Studies. XIV. Observations on the Pathogenesis of the Experimental Infection induced in Sheep by the Intravenous Route.** *Amer. J. Hyg.* 1952, Mar., v. 55, No. 2, 254-67, 3 figs. [15 refs.]

Eight sheep were inoculated intravenously with various doses of live yolk-sac cultures of *Coxiella* [*Rickettsia*] *burneti*; one animal died on the 5th day of "pulpy kidney", the other 7 were closely studied for 43 days and then were killed and thoroughly examined *post mortem*.

Apart from irregular spells of fever, which were usually most pronounced during the first 7-10 days after inoculation, no apparent signs of illness were detected among the animals. The antibody response was varied; after large doses the complement-fixation titre rose within about 5 days but after small doses it was delayed, in one case till the end of the 3rd week. The maximum titre ranged from 1-16 to 1-64. *Rickettsiae* were recovered from the blood of 6 of the sheep but not after the 3rd day except from one animal in which they were present up to the 8th day. *Rickettsiae* were recovered after death from pooled suspensions of the liver, spleen and kidneys of a sheep from whose blood the organisms could never be recovered during life.

In 423 tests of various secretions, carried out from day to day, *rickettsiae* were recovered from the nasal secretion of one animal on the first day and in mammary secretion of another on the 40th and 43rd days; all specimens of urine, faeces and oral secretions were negative.

At autopsy all the sheep were in excellent condition; of the various lesions found the only ones that might be considered significant were subserosal haemorrhages in the hearts of 2 sheep, small infiltrations of mononuclear cells in the myocardium and round the small vessels of 2 other sheep. *Rickettsiae* could not be recovered after death from the brain, heart and aorta of any animal; pooled suspensions of the spleen, liver and kidneys of 5 sheep were infected, the lungs of one of these were infected, and so were the mammary gland and the supramammary lymph nodes of another.

John W. D. Megaw

LUOTO, L., WINN, J. F. & HUEBNER, R. J. **Q Fever Studies in Southern California. XIII. Vaccination of Dairy Cattle against Q Fever.** *Amer. J. Hyg.* 1952, Mar., v. 55, No. 2, 190-202. [20 refs.]

A group of 147 uninfected cows were vaccinated with two doses of killed yolk-sac vaccines of *Coxiella* [*Rickettsia*] *burneti* and were introduced to herds known to be infected with Q fever; a group of 139 unvaccinated cows served as controls. Among the vaccinated animals 14.9 per cent. developed complement-fixing antibodies within an average period of 28.6 weeks; 46 per cent. of the controls developed antibodies in an average period of 26.8 weeks. In a large series of tests 23.7 per cent. of the control cows yielded infected milk against 4.8 per cent. of the vaccinated.

Full details are given of the methods of preparing and assaying the vaccine and of the strict precautions taken to ensure comparable conditions of exposure to risk of infection for the two groups. The authors conclude that "the study suggests the possibility of the use of vaccine to control Q fever in dairy cattle and the need for further research and field studies on this phase of the problem".

John W. D. Megaw

DENGUE AND ALLIED FEVERS

BIRKS, P. H. **Dengue in Northern Assam Tea Gardens.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Mar., v. 46, No. 2, 195-200, 3 graphs. [12 refs.]

Dengue has not previously been recognized in the tea districts of Northern Assam, although ROGERS and MEGAW [this *Bulletin*, 1935, v. 32, 151] include this area in their distribution map of the disease.

Aedes albopictus, which has been proved to be a vector of dengue, is found in large numbers in the bamboo plantations of Northern Assam, breeding especially in the open cups left after a stake has been cut away. *Aedes variegatus*, frequently found in the same area, has not been definitely proved to be a vector.

In June and July, 1951, 9 Europeans, including 4 children, developed a fever in which adenitis and leucopenia (3,000 to 7,200 per cmm.) were present in all cases. The symptoms were intense frontal headache, pain in the back, limbs and eyes, and a macular rash (3 cases). Concurrently with these cases there occurred in the tea garden labourers widely scattered outbreaks of an exanthematous fever which was diagnosed as measles. On examination of these cases the author was struck by the marked adenitis and the absence of Koplik's spots, while the temperatures were not typical of measles and often showed a "saddle-back curve". The incidence of "measles" over 10 years was investigated in 6 tea gardens. Usually the highest incidence was in May, June, July and August. In one garden in one year there was a cold weather outbreak. Further doubt on the diagnosis of measles was cast by the generally accepted view that 63 per cent. of cases occur during the winter.

It was found that variations in health between various gardens depended on their lay-out; thus some gardens have their bamboo plantations situated peripherally and more remotely, others have these plantations situated centrally, so that the whole population is exposed to infection at once, thus causing an explosive epidemic. At the same time as the outbreaks of "measles" many adult labourers suffered from adenitis, severe pains and fever with leucopenia. A definite diagnosis of dengue was based on: (1) specific complaint of pain, (2) adenitis, (3) leucopenia, (4) rash, (5) saddle-back temperature, (6) recovery without specific treatment; this diagnosis was made in 270 cases since August 1951. The extent of the disease was probably much larger than this figure would indicate. One elderly patient developed hyperpyrexia on the third day of the attack and died in coma. [No mention is made of routine examination of the blood for malaria.] On the day of this patient's death the dry bulb temperature was 98°F., and the wet bulb 89°F.

Sequelae were—diarrhoea, skin sepsis, and occasional purulent myositis. Many young children developed obstinate diarrhoea, loss of weight and cachexia. Serious retardation of growth may occur in infants.

In this outbreak of fever indistinguishable from dengue the presence of *Aedes albopictus* in close relationship with the disease was established and doubt was cast on the diagnosis of measles in the dengue season. Brief notes are given on the findings in 5 gardens.

[The great value of this paper is in stressing the possibility of misdiagnosing dengue as measles. This is particularly liable to occur in the somewhat rare cases where the rash, often accompanied by coryzal or bronchitic symptoms, appears at the onset of fever, before the remission. The reviewer has seen a few cases of this nature where the differential diagnosis was almost impossible at the time of onset.]

C. F. Shelton

PLAGUE

RAO, K. A. **An Outbreak of Plague in Nanded (Hyderabad State) with particular reference to Treatment with Sulpha Drugs and Streptomycin. A Report on 407 Cases.** *Indian Med. Gaz.* 1952, Jan., v. 87, No. 1, 21-4.

The most remarkable finding in this analysis of the results of treatment of 407 cases of plague is that among 155 patients known to have been previously inoculated there was only one death, whereas among 222 uninoculated there were 14 deaths. There were no deaths among the 30 patients whose inoculation history could not be ascertained.

All the patients were treated with sulphonamide drugs, of which sulphadiazine was preferred on the ground of absence of nausea or vomiting, but it was given to only 42 patients whereas cibazol was given to 94 and thiazamide to 271. The dosage of each drug was 2.0 gm. on admission; 1.0 gm. every 4 hours for one day, then every 6 hours till the temperature had fallen to normal, and 1.0 gm. twice daily for 2 more days.

Of the 91 patients who received only the sulphonamide drugs 3 (3.3 per cent.) died. The other 316 patients received in addition 0.5 gm. streptomycin every 12 hours, or in very severe attacks every 8 hours, for 2 days; of these 12 (3.8 per cent.) died, a slightly higher percentage, but the author is convinced that the combined treatment gave better results, especially in patients who were unconscious or semi-conscious on admission; 6 such cases were treated with sulphonamide drugs only, and 3 of them died as compared with 137 cases and 11 deaths in the group receiving the combined treatment.

John W. D. Megaw

HOLDENRIED, R. **Sylvatic Plague Studies. VII. Plague Transmission Potentials of the Fleas *Diamanus montanus* and *Polygenis gwyni* compared with *Xenopsylla cheopis*.** *J. Infect. Dis.* 1952, Mar.-Apr., v. 90, No. 2, 131-40.

The author wishes to develop quantitative ways of comparing the efficiency of different species of flea as transmitters of the plague bacillus. The question arises in the Western U.S.A., particularly in relation to the flea of the ground squirrel (*Citellus beecheyi*), one of the most frequent victims of plague among the numerous sorts of wild rodent. But the question, and the methods, results and discussion of them in the present paper, are of general interest.

Several ways of exposing fleas to infection, and of treating them subsequently, were developed. For instance, 155 *Xenopsylla cheopis* were fed on an infected mouse, shortly before death, and showing a high bacillaemia. They were then starved for some days and maintained on mice. Even 31 days after the infecting meal, 5 out of 10 fleas individually tested were positive; taking the results together, 62 per cent. of the fleas, tested at intervals up to 31 days, were shown to be infected. Infection could be transmitted by one flea to a number of mice.

The author calls attention to the fact that some individual fleas do not become infected : others are infected and remain so until death. What proportion may have been " blocked " is not known, as the fleas were disturbed as little as possible between the infecting meal and their death.

The results with *Diamanus montanus*, a flea of the ground squirrel, are less consistent, and there is published evidence suggesting that it can transmit plague in some areas, not in others. In many of the present experiments, no transmission occurred, though the fleas fed on infected mice : indeed, of 446 fleas from 6 places only 9 transmitted *P. pestis*. On the other hand, 8 out of 60 (13 per cent.) *D. montanus* were found to be infected 22 to 31 days after the original meal.

In experiments with *Polygenis gwyni* of the cotton rat (*Sigmodon hispidus*) transmission was frequently obtained, often to several mice in succession : infection persisted in these fleas, and this species " has one of the highest plague vector efficiencies of the native North American rodent fleas ". But the efficiency of *X. cheopis* is evidently higher. P. A. Buxton

VAN SOMEREN, G. R. C. **Tests with ' Gammexane ' Larvicide (Benzene Hexachloride) as a Rodenticide.** *East African Med. J.* 1952, Mar., v. 29, No. 3, 107-19.

The results of the experiments described suggest that rodent control may be possible by applying powdered " Gammexane " (benzene hexachloride) to floors at the rate of 2.0 gm. per square foot or by blowing the powder into the holes of the animals.

When groups of 5-10 rats or mice were kept continuously in cages with floors 1 foot square made of various materials and covered with a thin layer of Gammexane powder containing 1.0-3.0 gm., nearly all the animals became comatose in 12-60 hours and died within a further period of about 24 hours. Animals exposed to similar conditions for 30 minutes and then removed to normal cages were not affected. Rats and mice caused to run once along a strip 24 inches long and 3 inches wide covered with 1.0 gm. Gammexane powder were not affected even when several daily runs were made. When the strip consisted of damp soil covered with 2.0 gm. Gammexane and daily runs were made 4 rats (*Rattus rattus*) died after 180-276 hours.

Gammexane was found effective as a rodenticide when given with maize meal at strengths of 0.5-2.0 per cent. Mice fed on a bait containing 0.25 per cent. Gammexane were dead or comatose within 36 hours and all had died within a further period of 36 hours ; the poison bait was available throughout the test period. For rats, a bait containing 1.0 per cent. was lethal though there were one or two cases of remarkable resistance to the poison.

The gamma isomer is believed to be the toxic agent and as this is present to the extent of only 3.0 per cent. in Gammexane it must be highly lethal to rodents.

[No reference is made to the toxic action of the drug on rat fleas ; this must be a very valuable property of the substance when applied in the powdered form to the haunts of the rodents. The word " benzine " is used throughout the paper in place of " benzene ".] John W. D. Megaw

GIRARD, G. Comportement des rats lépreux (maladie à bacille de Stefansky) vis-à-vis de l'infection pesteuse expérimentale. [The Reaction of Rats Infected with the Stefansky Bacillus of Rat Leprosy to Experimental Plague Infection] *C. R. Soc. Biol.* 1951, Nov., v. 145, Nos. 21/22, 1627-30.

The author describes the experiments mentioned in his paper on the resistance of persons with leprosy to plague infection [see this *Bulletin*, 1952, v. 49, 700].

A definite degree of association appeared to exist between the resistance of the rats to plague inoculation and the intensity of the infection with Stefansky's bacillus.

John W. D. Megaw

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

SERSALE DI CERISANO, L. *Entameba histolytica* y antibióticos. Características comparadas de la infección amebiana en diversos países. [*Entamoeba histolytica* and Antibiotics. Comparative Features of Amoebic Infection in Different Countries] *Jornada Méd.* Buenos Aires. 1951, Feb., v. 5, No. 45, 46-52. [15 refs.]

A review.

AMARAL, A. D. F. & PIRES, C. D. de A. A aureomicina no tratamento da amebíase. [*Aureomycin in the Treatment of Amoebiasis*] *Folia Clin. et Biol.* S. Paulo. 1951, June, v. 17, No. 1, 3-15. [17 refs.] English summary.

Success in 9 of 10 patients.

HOEKENGA, M. T. *The Prophylaxis of Malaria and Amebiasis with Milibis-Aralen.* *J. Lab. & Clin. Med.* 1952, Feb., v. 39, No. 2, 267-70. [11 refs.]

Malaria and amoebiasis are major causes of morbidity throughout the world, especially in the tropics and subtropics. A combination of drugs which can be given in a single tablet both for the treatment and for long-term mass prophylaxis of these diseases seems desirable. Chloroquine (Aralen) and Milibis (bismuthoxy-para-N-glycolyl-arsanilate) were the drugs selected. Chloroquine in addition to its effective anti-malarial properties is remarkably effective in extra-intestinal amoebiasis. Milibis has been shown to cure a high percentage of cases of intestinal amoebiasis. The Milibis-Aralen tablets, each containing 250 mgm. of Milibis and 75 mgm. of Aralen, were used for the mass prophylaxis of a labourer population at a banana plantation in Honduras, where the incidence of intestinal amoebiasis was high. The inhabitants of alternate blocks of buildings were given a single dose of the tablets on each of two consecutive days every week for 12 weeks; those living in the intervening buildings were not so treated, and were observed as controls. A single dose for those of more than 6 years of age was 3 tablets, that for those between 4 to 6 years was 2 tablets, between 1 and 3 years it was 1 tablet, and below this it was half a tablet; 132, 26, 31 and 12 patients fell into these respective categories; the total number of tablets for each was 72, 48, 24 and 12 respectively. The side effects, in all but 2 doubtful cases, of the treatment were negligible.

The results of stool examinations at the end of the 12-week period showed a decline from 35.8 per cent. to 3.4 per cent. of *E. histolytica* positive stools from about 200 persons in the treated group; the corresponding figures in the control group were 33.9 per cent. and 28.9 per cent. No cases of clinical amoebiasis or of clinical malaria occurred in the treated group; but there were 12 hospital admissions for symptomatic intestinal amoebiasis, 1 for hepatic amoebiasis, 8 for *P. falciparum* malaria, and 7 for *P. vivax* malaria from the control group. In areas where malaria and amoebiasis are endemic a combination of Milibis and Aralen given prophylactically will prove valuable.

A. R. D. Adams

ASAMI, K. & NAKAMURA, N. **Morphology and Taxonomical Position of an Amoeba which spontaneously contaminated an Agar Plate of *Shigella* Culture.** *Kitasato Arch. Exper. Med.* 1951, Nov., v. 24, No. 2, 215-18.

"1) A study was made on the morphology and taxonomical position of an amoeba recovered by Nakamura on an agar plate of *Shigella* culture.

"2) The trophozoite measured $6.2\ \mu$ in diameter, in an average, with large karyosome and without peripheral chromatin granules.

"3) During nuclear division it has no polar cap.

"4) Cyst is uninucleate, cyst wall is thick and not perforated.

"5) This amoeba probably belongs to genus *Hartmanella*, but it was impossible to decide its specific name."

RELAPSING FEVER AND OTHER SPIROCHAETOSIS

DUBOIS, A. Le traitement arsénical de la fièvre récurrente à tiques. [**Arsenical Treatment of Tick-Borne Relapsing Fever**] *Ann. Soc. Belge de Méd. Trop.* 1952, Feb. 29, v. 32, No. 1, 35-9. [10 refs.]

The following is a translation of the author's summary :—

In two European cases the author has shown that 914 [neoarsphenamine] given early makes it possible to achieve decisive cure of *Sp. duttoni* infection (laboratory infection from handling mice). It is desirable to have the action of 914 on this infection accurately assessed, although it is very probable that aureomycin is likely to replace it.

H. J. O'D. Burke-Gaffney

GUGGENHEIM, K. & HALEVI, S. **The Effect of Thiamine Deficiency on the Resistance of Rats to Infection with Spirochetes of Relapsing Fever.** *J. Infect. Dis.* 1952, Mar.-Apr., v. 90, No. 2, 190-95. [19 refs.]

"1. Young rats maintained during two weeks on a thiamine-deficient diet were inoculated intraperitoneally with *Borrelia persica*. They displayed a more severe degree of infection, a longer duration of attacks and a higher fatality rate than control rats given a full diet ad libitum.

"2. The diminished resistance of thiamine-deficient rats was only to a minor degree the result of the thiamine deficiency per se but to a larger extent the effect of the concomitant caloric deficiency.

"3. Rats fed a thiamine-subdeficient diet did not show any impairment in their resistance to an infection with relapsing fever spirochetes."

See also p. 800, FALCONE. **Eye Complications of Relapsing Fever in Somaliland.**

SHELDON, W. H., HEYMAN, A. & EVANS, Lilian D. **Production of Herxheimer-Like Reactions in Rabbits with *Spirillum minus* Infections by Administration of Penicillin or Immune Serum.** *Amer. J. Syph.* 1951, Sept., v. 35, No. 5, 411-15, 3 figs.

"These studies demonstrate that the administration of penicillin to rabbits infected with *S. minus* produces a transient acute inflammatory reaction in the skin lesions similar to that observed in the lesions of human and experimental syphilis during the Herxheimer reaction. The same histologic alterations can be produced in the skin lesions by the injection of large amounts of specific immune serum. This effect of immune serum probably depends upon antibodies which are known to immobilize and lyse the organism in vitro. The spirillicidal

property of serum disappears in vitro in dilutions greater than 1 : 4, indicating that large quantities of specific antibody are most likely required for the production of Herxheimer-like reactions.

"The results of our experiment suggest that destruction of *S. minus* produced by either penicillin or specific antibodies is an important factor in the pathogenesis of the Herxheimer-like reactions in rat-bite fever. It is reasonable to assume that histologic changes comparable to those produced experimentally occur in the lesions of patients with rat-bite fever during the acute exacerbation of the disease following spirillicidal therapy."

LEPROSY

DE SOUZA-ARAÚJO, H. C. & DE SÁ, J. G. Ensaios sôbre lepra experimental. Inoculações de três amostras de bacilos ácido-álcool resistentes (amostras "Chaves II", "Emilia" e "Hecke") isoladas de leprosos, em trinta doentes da Colônia Mirueira. [**Trials in Experimental Leprosy. Inoculations of Three Cultures of Acid-Alcohol-Fast Bacilli, Isolated from Patients with Leprosy, into Thirty Patients of the Colonia Mirueira**] *Mem. Inst. Oswaldo Cruz.* 1951, Mar., v. 49, 659-68, 3 figs. English summary.

The aim of the experiments was to produce in leprosy a phenomenon corresponding with Koch's phenomenon in tuberculosis. Three cultures were used and intradermal inoculations of 0.2 cc. of a suspension of each were made into the skin of the thighs of 30 patients who volunteered. Of these patients 16 developed lepra reaction; the inoculations produced craters with complete local destruction of skin in most of the patients. Tubes of Loewenstein medium were inoculated with material taken [presumably] from these ulcers, and cultures were obtained in 19 out of 20 tubes. One of these taken from a N-1 case was macroscopically and microscopically indistinguishable from two of the cultures inoculated. The authors conclude that "the majority of the patients showed partial or integral KOCH's phenomenon, with its classical general, local and focal reactions".
Ernest Muir

NOLASCO, J. O. **Histologic Studies on the Primary Lesions of Leprosy in Children of Leprous Parents, other Related Studies, including One Case with Necropsy.** *J. Philippine Med. Ass.* 1952, Jan., v. 28, No. 1, 1-19. [27 refs.]

The article is divided into 4 sections which deal in succession with : 66 primary lesions in very young children of an average age of 23 months born at the Culion leprosy colony ; 13 healed lesions which had been of a similar nature to those of the first group ; one child that died and was examined at autopsy ; 20 specimens from the "hazy pale macules" of Chiyuto ; and the autopsy findings in deep organs of 58 children of under 2 years who were still non-leprous.

In the first category all the lesions examined were very small, 50 of them measuring 5 to 15 mm. in diameter ; tuberculoid histology was shown in 50 and leprosy bacilli in 37 of them ; 52 of the children are still under observation at Culion, being now 11 to 16 years old ; only 3 of these have developed the disease.

In the second category the lesions of 10 could be followed, and the period between onset and resolution was on an average 10.3 months, and the period of clinical recession into scars was on an average 3.7 months. In these children the

examination indicated strong resistance, and this is confirmed by the fact that 12 of the 13 children, now 10 to 17 years old and still living in the Colony with their leprous parents, have not shown any further signs of active disease.

The autopsy was in a child of 17 months. During the 2 months before death from pneumonia the child was found to have a weal-like lesion of the right knee which was 4-plus bacteriologically positive. At the autopsy search was made for the lesion which was no longer clinically recognizable. The author concludes that "evidence is presented which tends to corroborate the belief that the early skin lesion of leprosy is the primary inoculated lesion. This conclusion is based on the finding of bacilli in considerable numbers only in the corresponding regional lymph nodes of drainage, but none in the other groups of lymph nodes examined. The spread of the infection in this case of early leprosy is by way of the lymphatics through the agency of the large monocyte."

The fourth section includes 2 studies. In the former reference is made to the "hazy depigmented areas" described by Chiyuto, and visible only on examination in proper light, which were supposed to be among early manifestations of leprosy. An opportunity of testing this theory was given by the death of a number of these children during an epidemic, and 20 specimens of these "hazy pale areas" were obtained at autopsy and studied histologically. "In all these 20 specimens, no apparent differences from normal-skin control sections could be found." The last study consisted of a search for leprotic lesions and acid-fast bacilli in the deep organs of 58 cases of children of leprous parents of under 2 years when brought to autopsy. "Both the paraffin and frozen methods of sectioning the Zenker-fixed tissues were used. In none of the organs examined was the leprotic lesion or any acid-fast bacilli demonstrated."

Ernest Muir

DE LAEY, A. & DUBOIS, J. La lèpre oculaire au Congo Belge. [**Ocular Leprosy in the Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1453-66. [64 refs.]

The first part of this article contains a nomenclature of the usual ocular complications of leprosy that occur in the Belgian Congo. It gives directions on treatment to doctors working in the isolated parts of the country. The second part contains the first statistics on ocular leprosy, made from examination of 200 inhabitants of the Belgian Congo. The result of these examinations shows that lesions of the eye are very frequent, but as a rule are not serious.

E. O'G. Kirwan

DHARMENDRA. **Recent Advances in the Treatment of Leprosy.** *Leprosy in India.* 1952, Jan., v. 24, No. 1, 4-18. [50 refs.]

A comprehensive review of the subject.

MUIR, E. **Treatment of Leprosy with Diaminodiphenyl Sulphone (DDS).** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Mar., v. 46, No. 2, 113-22, 1 chart.

COCHRANE, R. G. **The Action of Sulphones in Leprosy, with particular reference to Histopathology.** *Ibid.*, 122-6. Discussion of above papers 126-34 [INNES, J. R. ; SOMMERVILLE, J. ; KIRWAN, E. O'G. ; WHEATE, H. W. ; COOKE, W. E. ; LOURIE, E. M. ; BOYD, J. S. K. ; FAIRLEY, N. H. (President); MUIR, E. (in reply) ; COCHRANE, R. G. (in reply)].

In the first paper emphasis is laid on the profound change in the prognosis in leprosy which has followed the introduction of sulphones. The advantage of DDS over its derivatives is explained, because of its almost full absorption, slow excretion, safety in small effective doses, and consequent economy in

treating poor patients over extended periods. Other matters discussed are the dosage, the importance of early treatment, the reaction-anaemia complex and its control in certain cases by the use of vitamin B₁₂, the beneficial results of lepra reaction in patients under sulphone treatment, and certain ancillary forms of treatment. Lastly there was considered the likely future effects in bringing about the control of leprosy.

Dr. COCHRANE in his paper deals first with the changes which take place in bacilli in patients under sulphone treatment. These changes (fragmentation, etc.) make it more possible for bacilli to be phagocytosed. He warns against injudicious or inadequate mass treatment. In tuberculoid cases the response to sulphone treatment appears to be in proportion to the possibility of causing the lesions to pass into a reactive phase. Sulphones should not be given to patients while in this reactive phase. The action of the sulphones on *Mycobacterium leprae* in the tissues is not just the simple one of destroying the bacilli *in situ*, but a complicated one affecting the life history and metabolism of the organism.

In the discussion, Dr. ROSS INNES raised the question of other factors taking part in undesirable reactions, such factors being race, climate, nutrition, tropical anaemias, high altitudes, low protein staple diets, and the personality of the patient. Dr. SOMMERVILLE considered that we have now reached the stage in the treatment of leprosy that was reached in the treatment of syphilis in the early part of the century, and that possibly there would be in the future the same picture as in syphilis: a residuum of chronic infection that will require treatment which may be interrupted but certainly must be spread over a long period. Col. KIRWAN spoke of the need for care when the eye is involved in a general lepra reaction, sulphone treatment being interrupted till the reaction has subsided. Dr. WHEATE emphasized that sulphone treatment, however beneficial, does not do away with the need for segregation and other precautionary methods for stopping the spread of infection. *Ernest Muir*

MALFATTI, M. G. & JONQUIERES, E. D. L. Investigaciones a través de la optica electrónica de la acción del tratamiento médico sobre la morfología del *Mycobacterium leprae*. [**Investigations by Means of the Electron Microscope of the Action of Medicinal Treatment on the Morphology of *Mycobacterium leprae***] *Semana Méd.* 1952, Apr. 3, v. 101, No. 14, 408-23, 18 figs. [17 refs.] English summary.

The article is illustrated with 18 figures, some of which are photomicrographs and others pen-and-ink drawings to clarify and explain these photomicrographs. Single bacilli are shown, some of them with vacuoles, some large and bulky, and some with fine granules. Also globi are shown, some of them full of bacilli, and others containing few or no bacilli but more or less full of fine granules. The authors uphold the theory of PALDROCK and other later writers that *Mycobacterium leprae* passes through phases of natural evolution one of which takes a fine granular form capable of passing through a fine filter. They suppose that the single bacillus is the form most vulnerable to sulphones, the bacilli in the globi are less vulnerable because of the difficulty of penetrating the globus, and the granules are the least vulnerable of all. The vacuoles in the single bacilli are the sign of degeneration. They confess that it is difficult to determine which of the changes found are due to natural changes and which are the effects of treatment. *Ernest Muir*

FLOCH, H. & HORTH, R. Intérêt du tocophérol dans le traitement des névrites et des troubles trophiques de la lèpre. [**Use of Tocopherol in the Treatment of Neuritic and Trophic Lesions of Leprosy**] *Arch. Inst. Pasteur de la Guyane et du Territoire de l'Inini.* Publication No. 245. 1951, Oct., 4 pp.

ROLLIER, R. Notes préliminaires sur un nouveau traitement de la lèpre. [**Pre-liminary Note on a New Treatment of Leprosy**] *Maroc Méd.* 1950, Feb., v. 29, No. 297, 238.

A fuller account was summarized in this *Bulletin*, 1951, v. 48, 1128.

FLOCH, H. L'Assistance sociale aux lépreux et à leur famille. [**Social Assistance to Sufferers from Leprosy and their Families**] *Arch. Inst. Pasteur de la Guyane et du Territoire de l'Inini.* Publication No. 241. 1951, Sept., 6 pp.

HELMINTHIASIS

MOIGNOUX, J. B. La gélose formolée et son emploi en helminthologie. [**The Use of Formalized Agar in Helminthology**] *Méd. Trop.* Marseilles. 1952, Jan.-Feb., v. 12, No. 1, 81-2.

A note on the preparation of specimens.

GAUD, J. & JAUBERTIE, R. Rôle des facteurs humains dans la répartition géographique des bilharzioses en Afrique. [**Rôle of Human Factors in the Geographical Distribution of Schistosomiasis in Africa**] *Ann. Parasit. Humaine et Comparée.* 1951, v. 26, Nos. 5/6, 420-39, 8 figs.

The following is a free translation of the authors' summary in French :—

It is difficult to find a correlation between the distribution of schistosomiasis in Africa and any physico-geographical factor. In several regions in central Africa the molluscan vectors of one or other of the schistosome infections exist in the absence of the disease itself, which suggests that in Africa there is scope for further spread of schistosomiasis. It seems that human agency has in the past and will in the future be the most important factor in this spread. Human migrations in the past are probably responsible for the present geographical distribution of *S. mansoni* and *S. haematobium* in central Africa and present-day large-scale importation of labour may continue this insidious spread.

The concentration of human population in the vicinity of water, where molluscan vectors abound, is a very important factor in schistosomiasis. The social and economic advantages of this concentration, which is fostered by the authorities, are obvious, but suitable hygienic measures should be instituted to offset the resulting ill-effects. The introduction of new methods to improve the diet of Africans, notably in rice cultivation and fisheries, tends to increase the incidence of schistosomiasis. The question of nutrition is an important one and should not be interfered with, but the risks of increasing schistosomiasis should be kept at a minimum.

J. J. C. Buckley

DESCHIENS, R. Le problème sanitaire des bilharzioses dans les territoires de l'Union française. Généralités et répartition géographique. [**Schistosomiasis in the French Union**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 5/6, 350-77, 12 maps. [20 refs.]

This is an important paper on the geographical distribution of *Schistosoma haematobium* and *S. mansoni* in the French overseas territories. *S. japonicum* is not included in this survey, and the statement is made that it does not occur in Indo-China.

S. haematobium is found in North Africa, French West Africa, Equatorial Africa and Madagascar, and *S. mansoni* in West and Equatorial Africa,

Madagascar, and in Guadeloupe and Martinique. Maps are reproduced which show the distribution of these infections in some detail, and in the text there are indications of the degree of infection in the different places, with some information on snail hosts. [See also this *Bulletin*, 1952, v. 49, 281.]

Charles Wilcocks

DESCHIEENS, R. Le problème sanitaire des bilharzioses dans les territoires de l'Union Française. (Fréquence, mollusques vecteurs, conditions étiologiques.) [**Schistosomiasis in the French Union. (Frequency, Snail Vectors and Aetiological Factors)**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 9/10, 631-67, 2 figs. on 2 pls. [26 refs.]

In this, the second of a series dealing with schistosomiasis in the French Union territories, the author writes about the incidence and importance of the disease; the species, habitat and biology of the snail vectors and also the biology of the larval stages of schistosomes, and the factors involved in human infection.

The incidence is conveniently summarized in tabular form which gives average percentage infection rates in the different territories derived from surveys carried out between 1946 and 1950. The relation between the number of cases of schistosomiasis in these territories and the general morbidity rate is similarly presented. This is followed by a more detailed discussion of the data available from each territory.

The molluscan hosts of *S. mansoni* and *S. haematobium* are listed and the species involved or accepted as intermediary in particular localities are discussed in relation to nomenclature and, where available, to the infection rate of the snails [see also above].

J. J. C. Buckley

VERMEIL, C. Présence de *Bulinus contortus* Michaud à Rhat (Fezzan). [**Presence of *Bulinus contortus* at Rhat (Fezzan)**] *Ann. Parasit. Humaine et Comparée.* 1951, v. 26, Nos. 5/6, 415-19, 1 map.

A seasonal incidence of *Bulinus contortus* having been suggested by the failure of some previous searchers to find this species of snail in Rhat (Fezzan), parts of which are known to have human infection rates of up to 68.75 per cent. with *S. haematobium*, the author visited the place in May, 1951, and found the snails in several different localities.

J. J. C. Buckley

VERCAMMEN-GRANDJEAN, P. H. Sur la chaetotaxie de la larve infestante de *Schistosoma mansoni*. [**Arrangement of the Hairs of the Infective Cercariae of *S. mansoni***] *Ann. Parasit. Humaine et Comparée.* 1951, v. 26, Nos. 5/6, 412-14, 1 fig.

The presence of very delicate hairs on the cercariae of *S. mansoni* was referred to by GORDON, DAVEY and PEASTON in 1934 [this *Bulletin*, 1935, v. 32, 237], since when they appear to have been ignored. The present author brings them prominently to notice and gives them a new significance by demonstrating their constancy in number and symmetrical arrangement on the body of these cercariae. They are 24 in number and each of them arises from a minute papilla. Owing to their extreme delicacy they are difficult to see and for this purpose it is emphasized that the cercaria must be examined while alive, mounted in fresh, clear human serum at 30°C. It is concluded that this discovery opens up the

possibility of a new classification of schistosome cercariae, in that different species, e.g., *S. haematobium*, *S. bovis*, *S. intercalatum*, *S. matthei* etc., may have different arrangements of the hairs. J. J. C. Buckley

STANDEN, O. D. **The *in Vitro* Effect of Normal and Immune Serum upon the Cercariae of *Schistosoma mansoni*.** *J. Helminthology*. 1952, v. 26, No. 1, 25-42, 1 pl. [15 refs.]

During the progress of the author's work, PAPIRMEISTER and BANG [this *Bulletin*, 1949, v. 46, 55], and VOGEL and MINNING [*ibid.*, 1154; 1950, v. 47, 635] have described the reaction *in vitro* of various sera on living schistosome cercariae. Study of the literature shows that the formation of a precipitate around the larvae of metazoan parasites immersed in immune serum is not confined to trematode larvae. The immediate purpose of the present investigation was to determine the reaction to the cercariae of *Schistosoma mansoni* of the normal sera of man and animals.

The examination was made by putting 20 drops of centrifuged serum in a sterile 5 cc. beaker, and adding to it a drop of a heavy suspension of the cercariae of *S. mansoni* obtained from experimentally infected *Australorbis glabratus*. The mixture was incubated at 37°C. and examined microscopically at 1, 3, 6 and 24 hours. It was noted that a critical reaction was usually seen in 3 hours. Some 500 human sera and a variety of animal sera from various sources were thus examined.

Of the 502 fresh normal human sera all but 24 per cent. were found to be at least to some extent cercaricidal; that is, cercariae were killed by the sera and they then disintegrated in it to a greater or lesser degree; but no precipitate was formed by the normal human sera around their bodies either when alive or after death. Of the normal human sera examined 9 per cent. were rated as strongly cercaricidal, and 65 per cent. were variably so. The cercaricidal component proved to be thermolabile, disappearing from the sera after heating to 56°C. for 30 minutes; it also disappeared on storage of the serum; in these respects it resembled complement. In the case of the 24 per cent. of the human sera which were found to be non-cercaricidal, no enveloping precipitate formed around the cercariae immersed in them.

Of the fresh animal sera examined the majority were cercaricidal. [The details are set out in a table, which should be consulted by those interested in the subject.] But in addition to their cercaricidal properties the sera of some of the species of animals examined, notably those of cats, dogs, horses, and sheep, and particularly those of cattle, produced a precipitate around the larvae resembling that formed by immune human sera. The presence or absence of the cercaricidal factor bore no relationship to the presence or absence of a variety of concomitant nematode infestations or of a *Fasciola hepatica* infestation.

The serum of a rabbit heavily parasitized with *S. mansoni* rapidly caused loss of motility, though not of mobility, of the cercariae *in vitro*. Within 20 minutes a peri-cercarial membrane began to form and this was complete in 40 minutes; it formed a restraining envelope within 2 hours, but it did not kill the enclosed cercariae. A similar reaction took place in sera from human beings infected with *S. haematobium* or with *S. mansoni*. [Details are given of the histories of the individual cases.] The possibility of cross reactions due to other infections of man, such as filariasis, clonorchiasis, and syphilis, was examined; there was no indication that such occurred, but the body of evidence is too small to draw any general conclusion.

After more extensive investigation this cercarial-serological reaction may eventually prove to be of value in the diagnosis of cases of schistosome infection.

A. R. D. Adams

EVANS, A. S. & STIREWALT, M. A. **Variations in Infectivity of Cercariae of *Schistosoma mansoni*.** *Exper. Parasit.* New York. 1951, Oct., v. 1, No. 1, 19-33, 8 figs.

Evans and Stirewalt observe that the worm load in an experimental host exposed to schistosome infection is influenced by several factors of which the most important are the density of exposure of the host, the resistance of the host to the parasite and the infectivity of the cercariae. They describe in great detail the procedures adopted in 2 experiments investigating the infectivity of the cercariae during the period of cercarial liberation from infected snails. They employed a Porto Rican strain of *S. mansoni* which had been maintained in white mice and golden hamsters for $3\frac{1}{2}$ years and exposed laboratory reared, for "several years", specimens of a Porto Rican strain of *Australorbis glabratus*. Snails with a shell diameter of 4-6 mm. were each exposed individually to one miracidium. Each mouse was exposed to 100 cercariae. The infected mice were autopsied after 4 weeks and the number and the sex of the recovered parasites were recorded. The liver, lungs, heart and kidneys were examined separately. The veins of all the abdominal organs were also examined.

In their first experiment, conducted between 14th March and 5th July, 1948, the snails "were subject to the normal seasonal variations of temperature and humidity" and in the second experiment, conducted between 22nd April and 4th August, 1949, the exposure of the snails, the maintenance of the exposed snails, liberation of the cercariae, exposure of the mice and the retention of the latter until autopsy "were all executed in rooms in which the temperature and humidity were constant at 23.3°C. and 62% wet bulb".

An inbred strain of mice was used to minimize heritable variation in susceptibility. The mice were all of approximately the same age. The authors record that "neither the sex of the definitive host nor pregnancy in females had any observable influence on worm development". Their conclusions are:—

"1. Statistically significant variations in infectivity of the cercariae were found at intervals throughout both the experimental periods, as shown by the worm recovery from infected mice.

"2. The results of the two experiments revealed a remarkable similarity in the periods of variation.

"3. These variations appear to be directly related to the physiological condition of the snail host.

"4. In investigations depending upon comparisons of numbers of adult parasites recovered from different individuals, each experimental unit should be accompanied by a control exposed to the same pool of cercariae."

Nineteen graphs illustrating, *inter alia*, "The potency of infection in snails (days) and percentage of cercariae maturing; potency of infection in snails (days) and number of snails remaining alive; potency of infection in snails (days) and number of male worms per mouse", etc., are published. [No mention is made of the numbers or the sexes of the worms recovered from the separately examined liver, lungs, heart and kidneys of the mice. It does seem strange that no abnormalities in the rate of development of the recovered worms were observed in those mice which were exposed when the infectivity of the cercariae was impaired.]

P. L. leRoux

PARAENSE, W. L. **Further Observations on the Sex of "*Schistosoma mansoni*" in the Infestations produced by Cercariae from a Single Snail.** *Mem. Inst. Oswaldo Cruz.* 1949, Sept.-Dec., v. 47, Nos. 3/4, 547-56. [Portuguese version 535-46, 21 figs.]

The examination, by dissection, of 400 specimens of *Australorbis olivaceus* from a brook at the Instituto Oswaldo Cruz revealed that 8.25 per cent. were

infected with *Schistosoma mansoni* and 2.5 per cent. with a furcocercous cercaria, *Dicranocercaria ocellifera*, the larval stage of *Clinostomum heluans*. Investigations revealed that the snails had become infected with *S. mansoni* by a labourer employed at the Institute. The snails had evidently been free of infection since 1931. The infective material was utilized for completing some previous observations on experimental infections produced by cercariae from a single snail.

Twenty-four guineapigs were exposed by partial immersion for 30 minutes in water containing the cercariae, and were then killed at intervals of 111 to 248 days and the livers examined for schistosomes. All the infections proved to be unisexual—13 animals infected with males and 11 animals with females. Fifteen per cent. of the females from 6 animals had "ovular bodies" either in the uterus or in the oötype. These "intra-uterine" bodies began to appear from 145 days after infection and are of "ovular nature". These bodies are highly polymorphic but the spine, present in almost every specimen, is usually terminal but sometimes it is postero-lateral and of normal shape. Embryonic structures were not observed in the shell. A seminal receptacle was not detected in any of the females. The development of the vitelline glands varied from very rudimentary to a very advanced stage when vitelline cells were present within the glandular follicles. Eggs were not observed in the sections of the intestine of the host but were present in the liver provoking a slight infiltration by epithelioid cells.

In the male infections the number of testes varied from 4 to 9. Supranumerary testes were encountered in 1 per cent. of the specimens examined. In two animals hermaphroditic males were observed and constituted 25 and 29 per cent. of the recovered males.

P. L. leRoux

SCHWETZ, J. Sur le problème des planorbes vecteurs de la bilharziose au Lac Albert et sur les mollusques gastéropodes du même lac. [The Problem of Snail Vectors of Schistosomiasis at Lake Albert and Gasteropod Molluscs from the Same Area] *Ann. Soc. Belge de Méd. Trop.* 1952, Feb. 29, v. 32, No. 1, 57-60.

FAIN [this *Bulletin*, 1952, v. 49, 415] believes that the important vector of *S. mansoni* is a riverine species *Biomphalaria alexandrina pfeifferi* and not, as SCHWETZ [*ibid.*, 1951, v. 48, 655] has stated, a lake-living species, *B. a. stanleyi*. In the present paper Schwetz supports his own first opinion, for the following 3 reasons: (1) Schistosomiasis is most prevalent among persons engaged in the lake-fishing industry. (2) Many of the streams do not contain snails belonging to the genus *Planorbis*. It is true that numerous *Planorbis*, many of which are infected, occur at the junction of river and lake, but these are lake, not riverine, snails. (3) Persons suffering from *S. mansoni* infections in this area always acknowledge that they have been exposed to lake water. In this paper, Schwetz also deals with certain points of disagreement, between Fain and himself, concerning the nomenclature and identity of various species of snails.

R. M. Gordon

FILES, Virginia S. A Study of the Vector-Parasite Relationships in *Schistosoma mansoni*. *Parasitology*. 1951, Dec., v. 41, Nos. 3/4, 264-9, 1 fig.

"In this study *Australorbis glabratus* from Puerto Rico, the Dominican Republic, Venezuela, Surinam and Brazil, *Biomphalaria pfeifferi* from Liberia, and *B. boissyi* from Egypt were exposed to strains of *Schistosoma mansoni* from Puerto Rico, Venezuela, Surinam and Egypt, and to seven cross-strains of *S. mansoni*. In many instances, incompatibilities between vectors and parasites of different endemic areas were noted. It is suggested that these

incompatibilities might be accounted for in two ways: (1) interspecific and intraspecific differences between vectors in respect of the physiological factors that are responsible for the development of the parasite in the snail, and (2) physiological differences between strains of the parasite. Evidence would seem to show that there are interspecific physiological differences between *Australorbis glabratus* and *Biomphalaria boissyi*; and that there are intra-specific differences between *Australorbis glabratus* from Brazil and *A. glabratus* from other countries here dealt with. In addition, it would appear that the parasite of Egypt differs physiologically from the parasites of Puerto Rico, Venezuela and Surinam; and that the parasite of Brazil differs physiologically from the parasites of the latter countries."

VERCAMMEN-GRANDJEAN, P. H. Considérations sur les mœurs de "*Xenopus laevis victorianus* Ahl." [Observations on the Habits of *Xenopus laevis victorianus*] *Ann. Soc. Belge de Méd. Trop.* 1951, June 30, v. 31, No. 3, 409-14.

The following is a translation of the author's summary:—

The author, who has devoted a previous study to the use of this batrachian for the early diagnosis of pregnancy, gives reasons for which, in his view, it could be used for the control of insect larvae and molluscs. In dissecting 155 *Xenopus*, he has found 231 molluscs, of which 53 were *Bulinus*, 74 *Lymnaea*, 62 *Planorbis*, and 42 bivalves in the intestines of 94 of them (60.5 per cent.). One *Xenopus* was capable of destroying 180-200 molluscs a month. In addition, dissections of 80 *Xenopus* has revealed the presence in their intestines of 1,138 larvae or nymphs of various insects (culicids, chironomids, dragon-flies and unidentified species). However, *X. l. victorianus* should not be used in fish-breeding areas as it is a formidable enemy of young fish.

H. J. O'D. Burke-Gaffney

LAGRANGE, E. & FAIN, A. Sur un nouveau prédateur des mollusques pulmonés d'eau douce transmetteurs de la bilharziose. [A New Predator of Fresh Water Snails which Transmit Schistosomiasis] *Ann. Soc. Belge de Méd. Trop.* 1952, Feb. 29, v. 32, No. 1, 53-5.

The authors set out to confirm the observations of VERCAMMEN-GRANDJEAN [above].

Among 50 specimens of *Xenopus laevis* captured in a pond near Blukwa (1,800 metres) in the Belgian Congo, 2 were found to be harbouring *Lymnaea natalensis undussumae* in the stomach. Similarly, one of 108 captured in 11 streams contained a planorbid, *Biomphalaria alexandrina pfeifferi*.

In captivity, the *Xenopus* (55 specimens) refused to ingest planorbids even by forcible feeding. Comparable studies showed that *Rana fuscigula* and *Bufo regularis* were little attracted by snails.

In the course of unrelated experiments on molluscicides, the authors noticed that small gauze containers containing planorbids which they immersed in natural waters, were frequently found to have been torn open and to contain only the débris of shells. This was traced to a crab, *Potamon didieri* and in experimental trials in streams, they found that 60 of 300 snails were destroyed in this manner. However, the results were less constant when the experiments were reproduced in an aquarium.

It was also found that *Potamon lirrangense* from Lake Kivu (and which is commonly found near Costermansville) also devoured planorbids. The authors speculate on the possibility of such crabs being effective in the control of schistosomiasis and suggest a study of their biology for that purpose.

H. J. O'D. Burke-Gaffney

SCHWETZ, J. **A Comparative Morphological and Biological Study of *Schistosoma haematobium*, *S. bovis*, *S. intercalatum* Fisher, 1934, *S. mansoni* and *S. rodhaini* Brumpt, 1931.** *Ann. Trop. Med. & Parasit.* 1951, Sept., v. 45, No. 2, 92-8, 9 figs. on 2 pls. [10 refs.]

The author observes that his contribution "is neither a compilation nor a critical analysis of papers by other workers, but is the result of personal investigations carried out in 1949-50". The schistosomes (*S. haematobium*, *S. bovis*, *S. intercalatum*, *S. mansoni* and *S. rodhaini*) can be divided into two groups: "Group I. Female: genitalia (ovary and oviduct) in the anterior half of the body; usually only one mature egg in the uterus; eggs with a lateral spine. Male; eight or nine testes. . . . Group 2. Female; genitalia in the posterior half of the body; usually numerous eggs in the uterus; eggs with a terminal spine. Male; four to six testes." *S. mansoni* and *S. rodhaini* belong to "Group I" and the other 3 species to "Group 2".

Biological and pathological differences are: *S. bovis* is the cause of animal schistosomiasis (intestinal and possibly vesical) and is transmitted by *Physopsis africana*; *S. mansoni* causes human intestinal infection and is transmitted by species of *Planorbis*; *S. haematobium* is the cause of vesical schistosomiasis in man, is transmitted by *Physopsis* except in North Africa where the molluscan host is *Bulinus*; *S. intercalatum* is the cause of intestinal schistosomiasis in certain regions of the Belgian Congo and is transmitted by *Physopsis africana*. It is accepted as a valid species because it invades only the veins of the intestines. The eggs of *S. intercalatum* are longer and narrower and the spine is longer and sharper than in *S. haematobium*. LANE's (1936) criticism that FISHER failed to infect *P. africana* with miracidia of human origin [this *Bulletin*, 1936, v. 33, 1] is disregarded by the author who claims to have infected mice with cercariae from 2 snails and to have infected snails with miracidia from these mice and to have passed the infection on to other mice. The eggs from these mice were identical with those from man. "The adults of all three species are very similar, so that, except for minor details, which are not constant, only the shape of the eggs distinguish the species morphologically." The infection of *P. africana* with *S. intercalatum* is claimed to be "more difficult and more delicate", than the infection of *Planorbis* with *S. mansoni*. It is difficult to distinguish between the eggs of *S. mattheei* from S. Africa and those of *S. intercalatum* because no differences between the eggs and the adult worms of these species could be detected. It is suggested that *S. intercalatum* may be *S. mattheei* adapted to man.

S. rodhaini has been obtained from mice that had been exposed to cercariae from *Planorbis pfeifferi* (= *P. adowensis*) at Elisabethville. Natural infections of wild rodents of the genera *Lophyromys*, *Pelomys*, *Thamnomys* and *Praomys* at Elisabethville with *S. rodhaini* have been observed. The eggs of this species are polymorphic. The spine may be either terminal or more often subterminal as recorded by Brumpt. The anterior end of the egg may be either rounded off or end in an appendix. Terminal spined eggs without an appendix resemble the eggs of *S. haematobium*. [The recorded polymorphism observed in the eggs of *S. rodhaini* is probably due to the fact that the eggs had not been effectively orientated during examination. In Corsica, Sardinia, Iraq and probably N. Africa the molluscan host of *S. bovis* is *Bulinus truncatus*. WERY (this *Bulletin*, 1951, v. 48, 745), examining the urine in cases of chronic haematuria in cattle in the Ruanda-Urundi Province in the Belgian Congo, claims to have found the eggs of *S. bovis*. (See also p. 783, FAIN and LAGRANGE.)] P. L. leRoux

MEIRA, João Alves. **Esquistosomiase Mansoni Hépatico-Esplênica.** [The Liver and Spleen in Schistosomiasis mansoni]

This book was reviewed on p. 737.

SCHWETZ, J. Nouvelles données sur *Schistosoma intercalatum* Fischer 1934. [New Data on *S. intercalatum*] C.R. Soc. Biol. 1951, Aug., v. 145, Nos. 15/16, 1257-9, 3 figs.

The following is a free translation of the author's summary in French :—

The results reported herein are that (1) the eggs of the trematode causing intestinal schistosomiasis in Stanleyville are very distinct from those of *S. haematobium*, and (2) this infection is transmitted by *Physopsis*. On biological and morphological grounds the worm is distinct and clearly should be regarded as a different species.

J. J. C. Buckley

FAIN, A. & LAGRANGE, E. Un foyer de bilharziose bovine à *Schistosoma bovis* dans l'Ituri. [A Focus of Bovine Schistosomiasis due to *S. bovis* in the Ituri Region] Ann. Soc. Belge de Méd. Trop. 1952, Feb. 29, v. 32, No. 1, 49-51.

The authors refer to the few published records of bovine schistosomiasis in the Belgian Congo [this *Bulletin*, 1935, v. 32, 242; 1951, v. 48, 48, 745], and then describe an apparently widespread focus in the pastoral region of the Ituri area. In three places from Nizi (1,400 metres) in the north to Irumu (900 m.) in the south, 12 of 14, all of 5, and 2 of 3 cattle respectively were found to be infected with adult worms. Morphological details and measurements are given of the adult worms and of the eggs from the uterus. Most of the adult worms were found in the mesenteric veins, and never in the mesocolon or bladder vessels.

In 3 animals examined, eggs were not found in the faeces, but were present in large numbers in scrapings of the mucous membrane of the small intestine, and rarely, the bladder. *S. haematobium* has not been recorded in human beings in Bunia or Irumu, though *S. mansoni* infections are widespread.

Eight species of freshwater snails were found and are listed. No infections nor snail hosts were found above 1,700 metres.

The authors warn others of the difficulty of finding *S. bovis* in infected animals.

H. J. O'D. Burke-Gaffney

SCHWETZ, J., BAUMANN, H. & FORT, M. Recherches sur *Schistosoma rodhaini* Brumpt 1931. Deuxième étude : le cycle évolutif de *S. rodhaini*. [Research on *Schistosoma rodhaini*. Second Study : Developmental Cycle] Ann. Parasit. Humaine et Comparée. 1951, v. 26, Nos. 5/6, 407-11.

The following is a free translation of the authors' summary in French :—

Although it has been shown that, working with *Schistosoma rodhaini*, transmission from the cercarial stage to the miracidial stage, i.e., from Planorbid snails to mice, is very easy and rapid, we have always failed in attempting to follow up the miracidium to cercaria phase, i.e., mice to snails, using the Planorbid species *glabratus*, *boissyi*, *tanganikanus* and *smithi*. On the other hand the species *Pl. pfeifferi*, collected in Elisabethville have a high infectibility, and as with other schistosomes was found infected between the 50th and 60th day. But it remains to be seen if *Pl. pfeifferi* from other localities is equally susceptible.

J. J. C. Buckley

SCHWETZ, J. & STIJNS, J. Sur la redécouverte de *Schistosoma rodhaini* Brumpt et la découverte de son hôte définitif. [Rediscovery of *S. rodhaini* and Discovery of its Definitive Host] C.R. Soc. Biol. 1951, Aug., v. 145, Nos. 15/16, 1255-7, 8 figs.

The following is a free translation of the authors' summary in French :—

Schistosoma rodhaini, described by BRUMPT in 1931 from some adult worms from a mouse infected by Dr. WALRAVENS by means of cercariae from planorbid

at Elisabethville, was found here once more by us in 1950. It is a schistosome of the *S. mansoni* group but is distinguishable especially by the shape of the eggs. It is a schistosome of rodents of the Elisabethville region, where several different species were found naturally infected. *S. rodhaini* is transmitted by the riverine planorbid of central Africa, known as *Planorbis pfeifferi* (= *Pl. adowensis*) which also transmits *S. mansoni*.

J. J. C. Buckley

SCHWETZ, J., FORT, M. & BAUMANN, H. Sur un procédé inédit d'activation de l'émission des cercaires de schistosomes par les planorbes. [**A New Method for Activating the Emergence of Schistosome Cercariae from Planorbids**] *Ann. Parasit. Humaine et Comparée*. 1951, v. 26, Nos. 5/6, 491-3.

Five snails, *Planorbis pfeifferi*, infected with *Schistosoma rodhaini*, were placed singly in water in 5 tubes at 9 a.m. and exposed to light and increasing temperature, up to 26°C., for the purpose of collecting the emerging cercariae. Nine hours later the yield of cercariae was very small, 1 in each tube, and the 5 snails were then replaced in a single tube with fresh water at 18-19°C. About 10 minutes later it was noticed that large numbers of cercariae had emerged. This procedure was repeated experimentally on 2 occasions with similar results and it was observed that a greater yield of cercariae was forthcoming when the temperature change was greater. It is thought that the phenomenon is due to a reaction on the part of the organs of the snail to the sudden change in temperature.

J. J. C. Buckley

McMULLEN, D. B., KOMIYAMA, S. & ENDO-ITABASHI, T. **Observations on the Habits, Ecology and Life Cycle of *Oncomelania nosophora*, the Molluscan Intermediate Host of *Schistosoma japonicum* in Japan.** *Amer. J. Hyg.* 1951, Nov., v. 54, No. 3, 402-15, 7 figs.

"1. The adults of *Oncomelania nosophora* have been shown to have some sexual dimorphism, the males being smaller than the females, but the sizes overlap.

"2. The sex ratio was 53.07 : 46.93 with the females predominating.

"3. The snails in most colonies observed laid most of their eggs in the spring but environmental factors in the locality caused considerable variation.

"4. The young snails grew rapidly at first and most of them reached adult size before they went into hibernation. In an area where reproduction was delayed about one third of the population passed the winter in the immature stage.

"5. Winter hibernation was found to extend from early November to March in most of the colonies.

"6. Physical changes and the application of a molluscicide greatly reduced the snail populations in two areas studied, but recovery was rapid.

"7. To get the best results with the known molluscicides it has been concluded that they should be applied as a dust or spray.

"8. The periods best suited for the use of molluscicides appeared to be in April and early May, after the snails came out of hibernation and before the ditches were used for irrigation; and in October, when the ditches were not in use and before the snails began hibernation.

"9. To get complete control it probably will be necessary to repeat the measures once or twice a year over a period of several years."

McMULLEN, D. B., ENDO-ITABASHI, T., SETO, S., KOMIYAMA, S. & STONE, P. R.
Seasonal Studies of *Schistosoma japonicum* in the Intermediate Host, *Oncomelania nosophora*. *Amer. J. Hyg.* 1951, Nov., v. 54, No. 3, 416-30, 5 figs. [15 refs.]

"Over a 25-month period, extending from October, 1947, through October, 1949, a study was made of the *Schistosoma japonicum* infections in *Oncomelania nosophora*, the intermediate host in Japan. Monthly collections were made at 4 stations in the Yamanashi endemic area and 56,123 snails were examined. The apparent age of each of the 1,449 *S. japonicum* infections observed was determined. The incidence and seasonal pattern varied from year to year, but in general most of the new infections were acquired late in the spring and early summer. Under certain conditions a number of infections appeared in the early fall. Old and young, male and female snails appeared to be equally susceptible. Many infections lived only 3 to 4 months but under suitable conditions a large number of those that were mature hibernated during the winter and extended their life span to about 12 months. The latter appears to be a factor in increasing human exposure during rice planting and its early cultivation."

HUNTER, G. W., RITCHIE, L. S., TANABE, H., NAGANO, K., PAN, C. & YOKOGAWA, M. **Studies on Schistosomiasis V. Testing Protective Ointments against Schistosomiasis by using Schistosome Dermatitis Producing Cercariae.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Mar., v. 46, No. 2, 201-6. [14 refs.]

"Six protective ointments selected for use against schistosomiasis were given field tests on 130 persons, using as the test organism the cercariae of the bird schistosome which causes 'koganbyo' or lakeside disease. Those tested lived in an endemic area, and due to repeated exposures, year after year, had acquired a marked sensitivity, making them good subjects for such a test.

"With an 8-hour test period of work in rice paddies, copper oleate gave 95.5 per cent. protection, with dibutyl and dimethyl phthalate giving around 70 per cent., followed by N-II, N-I and benzyl benzoate in that order."

NEUHAUS, W. **Biologie und Entwicklung von *Trichobilharzia szidati* n. sp. (Trematoda, Schistosomatidae), einem Erreger von Dermatitis beim Menschen. [Biology and Development of *Trichobilharzia szidati*, a Cause of Human Dermatitis]** *Ztschr. f. Parasitenk.* 1952, Feb. 20, v. 15, No. 3, 203-66, 26 figs. [Numerous refs.]

The following is an abbreviated translation of the author's summary :—

1. The morphology, development and biology of *Trichobilharzia szidati* is fully described.
2. The *ocellata*-group of cercariae, to which *T. szidati* belongs, are the cause of severe dermatitis among people employed in carp breeding in the Aischgrundes area.
3. The intermediate hosts are *Lymnaea stagnalis* and *Radix ovata*.
4. The morphology of the cercariae is modified according to the species of mollusc in which it develops.
5. The behaviour of the cercariae when finding its host has been studied. They show a positive phototaxis and a negative geotaxis. Activation of the cercariae is brought about by shade, disturbance and chemical stimuli. Warm-blooded animals are especially attractive.

6. The cercaria penetrates human skin in 5-10 minutes.
7. The duck has been found to be the natural host.
8. The cercariae reach the intestine *via* the blood-stream and are fully developed in 10-12 days.
9. The life span in the intestine is not more than 3 months.
10. Eggs in the gut wall become encapsulated after 2 months.
11. The miracidium develops in the egg in 4-5 days.
12. The miracidium shows positive phototaxis, negative geotaxis and shows positive chemotaxis towards substances excreted by the water snail.
13. At room temperature the first generation of sporocysts occur in 40 days, the second generation in 45 and fully developed cercariae in 80 days.

R. M. Gordon

BAILEY, W. S. **Host-Tissue Reactions to Initial and Superimposed Infections with *Hymenolepis nana* var. *fraterna*.** *J. Parasitology*. 1951, Oct., v. 37, No. 5, Sect. 1, 440-44, 2 figs.

SANDOSHAM, A. A. **An Investigation into the Association of Creeping Eruption with *Strongyloides* Infection contracted in the Far East.** *J. Helminthology*. 1952, v. 26, No. 1, 1-24, 1 fig. & 1 pl. [33 refs.]

The morphological data and experimental results obtained by the author tend to the belief that the *Strongyloides* associated with creeping eruption in ex-prisoners-of-war from the Far East, is *S. stercoralis*. Attempts to infect laboratory animals with it were negative. The failure to infect 2 human volunteers is thought to be due to loss of virility of the parasites from senescence and continued auto-infection. Reasons are put forward to explain the lack of records from the Far East of this type of creeping eruption and its common occurrence in returned prisoners-of-war infected with intestinal strongyloidiasis.

J. J. C. Buckley

PARONI, F. **Contributo radiologico allo studio dell'ascaridiosi.** [**X-ray Contribution to the Study of Ascariasis**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1951, Nov., v. 32, No. 11, 1047-56, 4 figs. [20 refs.] English summary (6 lines).

Short notes are given on each of 10 cases where abdominal symptoms had persisted for some time and had escaped diagnosis. Careful X-ray screening traced the trouble in each case to the presence of *Ascaris*, though examination of the stool had failed to reveal eggs or other evidence of the helminth in 9 of these cases. Three of the subjects harboured only one worm, and 3 others had only 2. X-ray screening of the alimentary canal for the presence of *Ascaris* calls for thoroughness and patience, involves much exposure of the radiologist's hands, as lead gloves interfere with the search and should not be worn, and may take up much time.

J. Cauchi

GUNSTONE, F. D. & HEGGIE, R. M. **Experiments on the Synthesis of Santonin. Part I. The Preparation of the Lactone of α -(2-Hydroxy-3-ketocyclohexyl) propionic Acid.** *J. Chem. Soc.* 1952, Apr., 1354-8.

GUNSTONE, F. D. & HEGGIE, R. M. **Experiments on the Synthesis of Santonin. Part II. The Preparation of Compounds containing the Dienone System present in Santonin.** *J. Chem. Soc.* 1952, Apr., 1437-42, 2 figs.

SPRENT, J. F. A. **On the Migratory Behavior of the Larvae of various *Ascaris* Species in White Mice. I. Distribution of Larvae in Tissues.** *J. Infect. Dis.* 1952, Mar.-Apr., v. 90, No. 2, 165-76, 12 figs. [39 refs.]

"Mice were infected by feeding the embryonated eggs of the following ascaris species: *Ascaris lumbricoides* (pig), *Ascaris lumbricoides* (human), *Ascaris*

columnaris, *Ascaris mustelarum*, *Parascaris equorum*, *Toxascaris leonina*, *Toxascaris transfuga* and *Toxocara canis*. The distribution of the larvae in the various tissues of the mice at daily intervals from one to fourteen days as well as at three and four weeks after infection was investigated.

"Two kinds of migratory behavior were observed. The first was manifested by most of the larvae of *A. lumbricoides* and *P. equorum* and consisted of migration through the liver, lungs and intestine, followed by eventual disappearance of living larvae from the tissues of the mouse (tracheal migration). The second type of migratory behavior was manifested by the larvae of the other species investigated, and resulted in more or less permanent infection of the rodent with encysted but living larvae (somatic migration). While the encysted larvae of *T. canis*, *A. columnaris* and *A. mustelarum* occurred mostly in the subcutaneous connective tissue and in tissues other than the intestines, many of the larvae of *T. leonina* and *T. transfuga* were encysted in the wall of the caecum and rectum."

JETTMAR, H. M. & EXNER, Hilde. Beiträge zum Studium der Chemoresistenz von Ascaris-Eiern. (Über die Entwicklungshemmung der Eianlagen durch verschiedene Chemikalien.) [Contribution to the Study of the Resistance to Chemicals of *Ascaris* Eggs] *Arch. f. Hyg. u. Bakt.* 1952, v. 136, No. 2, 85-96. [16 refs.]

This paper mainly describes experiments on the resistance to chemicals of ripe but non-segmented eggs of *Ascaris megalcephala*, extracted direct from the vagina and lower part of the uterus. The eggs, following immersion for different periods at a temperature of 30°C. in the chemical solutions, were examined to determine the extent of their normal development.

The chemicals tested were: (1) acids—sulphuric and hydrochloric, (2) alkalis—caustic soda and potash, (3) inorganic salts—sodium sulphite, sodium nitrite, potassium cyanide, zinc chloride, manganese chloride, ferrous sulphate, sodium chloride, copper sulphate, corrosive sublimate and potassium permanganate, (4) Lugol's solution, antiformin and carbon disulphide, (5) tri-chlorethylene, chloroform, carbon tetrachloride and ethyl alcohol, (6) formaldehyde, acetone, acetic acid and lactic acid, (7) soaps, (8) xylol, paradichlorbenzol, aniline, phenol, thymol, hexylresorcinol, hydroquinone and pyrogallol, and (9) pyridine, the oils of bergamot, camphor, chenopodium and castor, santonin, pyrethrum, zephirol and Dial-Ciba.

The effect of these chemicals is shortly described. Potassium cyanide, stannous chloride, Lugol's solution and carbon tetrachloride were found to be particularly harmful to the development of the eggs, as also were filtered emulsions of aniline in water in a dilution of 1 in 64 or 1 in 128. Mercuric chloride had no detrimental effect even in concentrated solution, although it is toxic when the outer shell of the eggs has been dissolved by harmless concentrations of acids.

M. E. Delafield

SOUTH PACIFIC COMMISSION. Conference of Experts on Filariasis and Elephantiasis. Papeete—Tahiti—French Oceania. 1951, Aug. 21-Sept. 1. Progress Report No. 9. Appendix to Annex II. Oct. 1951. [Restricted.] [Report of Meeting of Continuation Sub-Committee held on Sept. 5, 1951 (WRIGHT, W. H., Chairman).] 8 mimeographed pp.

SOUTH PACIFIC COMMISSION. Conference of Experts on Filariasis and Elephantiasis. Annotated Bibliography on Filariasis, Elephantiasis and Related Aspects in the South Pacific Area prepared by E. MASSAL & J. KERREST. Fil. Conf./4. 17th July, 1951. 20 mimeographed pp.

The authors hope to prepare a comprehensive annotated bibliography on bancroftian filariasis and elephantiasis. However, the existing library

facilities of the South Pacific Commission are limited, and the present list is restricted to South Pacific territories, so far as the authors have been able to cover the relevant literature. The list consists of 140 entries, most of which consist of brief summaries of papers and reports. The former are largely from American, British, French or Australasian publications, though the range is fairly wide.

This contribution will be of value to those specially interested; the more comprehensive bibliography contemplated by the compilers will be welcomed by readers of this *Bulletin*.

H. J. O'D. Burke-Gaffney

MANSON-BAHR, P. **Free-Living Nematodes as Spurious Parasites in Blood Preparations from Polynesians.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1952, Mar., v. 4, No. 1, 5-8, 7 figs.

The object of this paper is to record the warning that free-living nematode larvae can survive in certain common laboratory solutions and may contaminate blood preparations despite every reasonable precaution.

Between 1946 and 1948, during the course of filaria surveys organized by the late Dr. AMOS of Fiji, strange nematode larvae and occasional ova were found in some 14 of 600 blood specimens of Polynesians containing microfilariae. The technique in use involved removal of 1 ml. of venous blood into a centrifuge tube containing 9 ml. of 2 per cent. formalin in distilled water. The larva had a double-bulb oesophagus and a sharp tail, and varied considerably in size (from $800 \times 30 \mu$ to $300 \times 10 \mu$). It was assumed that these larvae were derived from contamination of the distilled water used.

In 1950, the author found a similar larva in a blood preparation, prepared in the main laboratory at Suva and taken from a patient with filariasis. The formalin and distilled water had been freshly prepared and contamination did not seem to be possible. On 5 subsequent occasions, blood from the patients and from 50 other Fijians were negative. All the solutions used proved to be negative on examination.

These "spurious parasites" were later identified in England by Dr. T. GOODEY as free-living nematodes of the genus *Aphelenchoides*. They can flourish in distilled water and are specially liable to adhere to the lumen of pipettes from which they are very difficult to dislodge. In these factors may be the explanation of their accidental presence in blood preparations. Thirteen species have been listed of which 3 have been reported in Fiji, associated respectively with the coconut palm, banana roots, and with soil, freshwater and decaying plants. The species in this case could not be determined. The ova and larva are illustrated in 7 figures.

H. J. O'D. Burke-Gaffney

VAN DEN BERGHE, L. & CHARDOME, M. **The Geographical Distribution of *Acanthocheilonema streptocerca* in the Belgian Congo.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Jan., v. 46, No. 1, 99-102, 1 fig. [12 refs.]

"(1) The literature on *Acanthocheilonema streptocerca* is briefly reviewed.

"(2) The geographical distribution of this filaria in the Belgian Congo is given according to available data and recent personal investigation.

"(3) *A. streptocerca* is widely found in the western, central, and north-eastern Congo, with percentages varying from 2 to 100. The infection does not occur in the south-east and extreme east. The incidence is very high, amounting to 100 per cent. of adults, south and east of Coquilhatville.

"(4) Similar regions of high incidence are probably to be found outside the Belgian Congo in central and western Africa."

SCOTT, J. A., MACDONALD, Etta M. & Terman, Barbara. **A Description of the Stages in the Life Cycle of the Filarial Worm *Litomosoides carinii*.** *J. Parasitology*. 1951, Oct., v. 37, No. 5, Sect. 1, 425-32, 9 figs. on pl. [15 refs.]

"A description of the stages of *Litomosoides carinii*, filarial parasite of the cotton rat, occurring in the tropical rat mite, *Bdellonyssus bacoti*, shows that they are essentially similar to those previously described for related species. The first molt occurs at about 9 days and the second at about 13 days at temperatures averaging 18 to 24°C. The third stage larva usually attains its maximum development in the mite in another 2 days and when transferred to the cotton rat continues to develop for about a week with slight increase in size. The molt from the third to the fourth stage is described for the first time. Considerable growth occurs during the fourth stage and the fourth molt is reached in about 24 days. The sclerotized stoma is a characteristic feature by which the third, fourth and adult stages can be distinguished. Since this is the first species among the filarial worms for which all stages and molts are described, it is of interest that the typical stages of the life cycle conform to those of other nematodes."

LEBIED, B. Une nouvelle théorie endémiologique. Sur le rôle de la fonction du parasitisme x mécanisme du vol du vecteur comme facteur décisif de l'établissement du foyer de l'endémicité de l'Onchocercose et de filarioses en général. [A New Endemiological Theory. Rôle of the "Function of Parasitism x Flight Mechanism of the Vector" as a Decisive Factor in Establishing Endemic Foci of Onchocerciasis and of Filariasis in General] 54 pp., 2 pls. [Bibliography.] 1950. [Privately printed at Dijon: Imprimerie Darantière.]

The author has made a detailed study of the development of the helminth *Onchocerca volvulus* in the vector *Simulium damnosum*, and concludes that the pathological changes caused by "sausage" forms developing in the fibres of the indirect flight muscles depress the efficiency of the muscles and, presumably, restrict the flight-range of infected flies. A considerable body of data is presented and discussed at length in support of this interpretation relating parasitization and flight efficiency in the infected fly. It is concluded that, if this conception is correct, it would provide an explanation for those instances of localization of onchocerciasis to restricted areas within a wider zone throughout which the vector *Simulium* occurs in numbers apparently sufficient to maintain transmission. If the flight-range of infected flies is more limited than that of uninfected flies the disease would tend to be less widely dispersed than the normal range of the vector. D. S. Bertram

MOIGNOUX, J. B. Recherches expérimentales sur le cycle évolutif des microfilaries d'*Onchocerca reticulata* Dies. en Camargue. [Experimental Study on the Developmental Cycle of Microfilariae of *Onchocerca reticulata* in Camargue] *C.R. Soc. Biol.* 1951, Oct., v. 145, Nos. 19/20, 1572-3.

GOETERS, W. Untersuchungen an Oxyuren. I. Mitteilung. Über das Vorkommen von Oxyureneiern im Nagelschmutz und im Zimmerstaub. [Studies on *Enterobius*. I. Presence of *Enterobius* Eggs in Dirt from Finger-Nails and in Dust from Rooms] *Ztschr. f. Hyg. u. Infektionskr.* 1952, Jan. 2, v. 133, No. 5, 463-80. [20 refs.]

The author's summary is essentially as follows:—

1. The dirt under the finger-nails of each of 86 children, known to be infested with *E. vermicularis*, was examined on twelve occasions. Forty-five of these

children were found, on one or more occasions, to harbour *E. vermicularis* eggs below the nails.

2. Various floatation methods were tried for the recovery of the eggs from the dust in rooms, and the conclusion was reached that the zinc chloride technique yielded the most reliable results.

3. It was found, when using the zinc chloride technique, that threadworm eggs could be demonstrated in the dust of all rooms used by children above the weaning age. The eggs occurred in greatest numbers in samples of dust collected from lavatories, bathrooms, the laboratory [presumably this was where the children were examined] and the section of the Institute which was reserved for tuberculous children.

4. By using a "sticky paper technique" eggs were demonstrated in places where only minute quantities of dust were present.

5. The viability of eggs found in the dust was demonstrated by allowing them to develop and the larvae to hatch in a peptone broth medium. Under these conditions, the proportion developing was similar to that occurring among eggs obtained directly from the ovigerous female worm.

6. The eggs collected from the dust remained viable in a dry medium for 9 days, and in a damp medium for 12-13 days. The optimum temperature for survival in a damp atmosphere was about 26°C.

R. M. Gordon

WELLS, Helen S. **Studies of the Effect of Antibiotics on Infections with the Mouse Pinworm, *Aspiculuris tetraptera*. III. The Actions of Aureomycin, Bacitracin and Polymyxin B.** *J. Infect. Dis.* 1952, Mar.-Apr., v. 90, No. 2, 110-15.

"1. Data on the effects of aureomycin, bacitracin and polymyxin B on infections with the mouse pinworm, *Aspiculuris tetraptera*, are presented.

"2. Aureomycin and bacitracin both decrease the worm burden and stunt remaining worms. Polymyxin B reduces the size of worms only."

MAGATH, T. B. & THOMPSON, J. H., Jr. **Diethylcarbamazine (Hetrazan) in Experimental Trichinosis.** *Amer. J. Trop. Med. & Hyg.* 1952, Mar., v. 1, No. 2, 307-13. [17 refs.]

"Large and excessive doses of diethylcarbamazine (Hetrazan), given under the conditions of the experiments described, did not affect the course of experimental trichinosis in the rat nor was there evidence that, in this animal, the drug had any demonstrable effect *in vivo* on the adults or on the larvae, migrating or encysted, of *Trichinella spiralis*."

DEFICIENCY DISEASES

FLOCH, H. & LECUILLER, A. Sur les levures alimentaires et leur utilisation éventuelle en Guyane française. [Edible Yeasts and their Potential Use in French Guiana] *Arch. Inst. Pasteur de la Guyane et du Territoire de l'Inini.* Publication No. 239. 1951, Sept., 6 pp.

NICOL, B. M. **The Nutrition of Nigerian Peasants, with special reference to the Effects of Deficiencies of the Vitamin B Complex, Vitamin A and Animal Protein.** *Brit. J. Nutrition.* 1952, v. 6, No. 1, 34-55, 2 figs. [42 refs.]

This paper describes 3 diet surveys carried out among different groups in Southern Nigeria and the results are compared with 3 surveys in Northern

Nigeria previously reported [this *Bulletin*, 1950, v. 47, 151]. The composition of the diets was determined by weighing for a week all the food consumed by the adult population. A full clinical examination of about 80 persons was carried out in each survey and the incidence of the various stigmata of malnutrition recorded. In the South and in one Northern group there was a plentiful supply of red palm oil and the mean vitamin A activity of these diets was over 5,000 i.u. daily. In two Northern groups with no red palm oil mean intakes were below 750 i.u. In these latter groups there was a high incidence of corneal opacity associated with dryness of the conjunctiva, staring hair and hypochromotrichia, general xerosis and follicular hyperkeratosis, "elephant skin", "crackled" skin and night-blindness. The conclusion is drawn that vitamin A deficiency is responsible for these. One group in the North with a high intake of sorghum had appreciably more riboflavin than the remainder. Here there was significantly less angular stomatitis, naso-labial seborrhoea, infection of the conjunctiva and permanent "gooseflesh". Riboflavin deficiency was considered an important aetiological factor in these conditions. In two groups in the South the staple foods were cassava and yams and little or no cereal was eaten; here levels of thiamine and nicotinic acid intake were low and there was a high incidence of calf tenderness (ascribed to thiamine deficiency) and magenta and lilac tongues and (in one group) of enlargement of the filiform papillae of the tongue. These last two are considered due to nicotinic acid deficiency. There was a high incidence in all the groups of folliculosis, atrophic skin, ulcers and scars of ulcers, thickened conjunctiva and photophobia. Long-continued minor traumata are probably the causes of these lesions, but deficiency of B-complex vitamins may exaggerate the effects of trauma. Pigmentation of the cornea is not the result of nutritional deficiency.

Comparisons of the growth rates of two groups with a good intake of fish with the remainder, whose animal protein came from very limited supplies of dried monkey, porcupine, weevils, snails, rats and similar delicacies, provided evidence in support of the existence of a growth-promoting "animal-protein factor".

[This analysis of the relationship between clinical signs of malnutrition and the varied dietary of the people of Nigeria makes fascinating reading. It is impossible in an abstract to do full justice to the many important points which have been raised.]

R. Passmore

BURCH, Helen B., SALCEDO, J., Jr., CARRASCO, E. O. & INTENGAN, Carmen L.
Nutrition Resurvey in Bataan, Philippines, 1950. *J. Nutrition*. 1952,
Feb. 11, v. 46, No. 2, 239-54, 3 figs. [16 refs.]

This paper records a repetition two years later of a survey carried out first in 1948 [see this *Bulletin*, 1949, v. 46, 390]. In the interval the rice consumed by the people, which was milled in the local mills, had been fortified by the addition of thiamine, nicotinic acid and iron in quantities so that 1 kgm. of the enriched rice provided 5.5 mgm., 40 mgm. and 33 mgm. of these nutrients respectively. Whereas in 1948 in the municipality of Orani there had been an incidence of 9.4 per cent. of beriberi, in 1950 the incidence was only 0.7 per cent. Detailed biochemical analyses of nutrients in blood and urine were carried out on samples of blood and urine in 1948 and again in 1950; these were collected on each occasion from 200 persons, of whom 64 per cent. were common to both surveys. Blood thiamine levels rose from a mean of 3.5 up to 4.3 μ gm./100 ml. and urinary thiamine from 65 to 253 μ gm./gm. of creatinine. Haemoglobin levels rose from 10.9 to 12.9 gm./100 ml. Serum ascorbic acid remained at a mean just below 0.5 mgm./100 ml. in both surveys. This is taken to indicate that consumption of leafy vegetables, tomatoes and citrus fruits had remained constant. Likewise

serum carotene values remained low. Riboflavin estimations were not done in 1948, but the mean figure of 3.7 $\mu\text{gm.}/100\text{ ml.}$ in 1950 is thought to indicate a low intake of this vitamin. Thus the chemical findings on changes in thiamine levels and in haemoglobin concur with the clinical reports on the reduced incidence of beriberi following the inauguration of the enriched rice programme in Bataan.

[The thiamine findings provide a nice biochemical confirmation of the clinical observations on the decline of beriberi. The raised haemoglobin levels, if substantiated as significant, would be an important new justification for an enrichment policy. But the difficulties of assessing its causation are great. On the one hand the authors state that the introduction of enriched rice "constituted the only major dietary change in this isolated agricultural peninsula where the pattern of food intake was well established". But earlier on we were told: "Striking improvements had taken place in Orani between 1948 and 1950. A new Health Centre of the United Nations International Children's Emergency Fund occupied a prominent place in the town. Electricity was available from 5:0 o'clock in the afternoon until midnight, whereas none had been available in 1948. The interest and alertness of the people had greatly increased: few were apathetic." Are we to believe that the staff of the Health Centre had prescribed no iron preparations and given out no food advice? How much of the "alertness" could be attributed to the electricity and how much to the new rice? Such questions emphasize the difficulty of interpretation of long-term nutrition experiments.]

R. Passmore

BANDMANN, P. J. Das Vitamin B-Mangel-Syndrom (Subakute Beri-Beri). [Subacute Beriberi] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1952, Feb., v. 3, No. 3, 396-405.

The rather elusive symptoms of lassitude, somnolence, fatiguability, lack of concentration and efficiency are apt to be ascribed to infection with *Ancylostoma duodenale*. Bandmann now would ascribe them to what he calls the sub-B syndrome (or subclinical beriberi). It is difficult indeed to define the exact standard by which it may be recognized. This assembly of symptoms is, of course, well known, and it is indeed very common among the peoples of South and South East Asia. In addition to the above may be added a feeling of "pins and needles" in the extremities, a sense of oppression in the chest and stomach, flatulence, anorexia, anaemia and low blood pressure. In children the syndrome manifests itself in loss of weight, skin affections, and stunted bodily and mental development.

It is claimed that these varied and extremely familiar complaints are due to a vitamin B₁ deficiency and this claim is based upon the symptomatic improvement which ensues after treatment with thiamine; furthermore that intercurrent febrile illnesses are apt to accentuate the clinical picture and eventually to produce classical beriberi. The difficulty of recognition lies in the fact that this partial avitaminosis is almost universal in a poorly nourished population, whereas only a small section develop recognizable chronic or acute beriberi.

It is of course well known and understood that vitamin B₁ deficiency must exist for some considerable time before any signs of illness manifest themselves.

Very little has so far been published about this sub-B syndrome, nor is any mention made to it in textbooks of tropical medicine. It is only recently that such a deficiency syndrome has been recognized, especially by American nutritional research workers.

The sub-B syndrome is not merely confined to Asiatics, but occurs also in Europeans and Americans living in the tropics.

In quite a proportion there is found, not surprisingly, a history of alcoholic abuse, of which some particularly lurid examples are given in the text, and in which remarkable results are claimed to have been obtained by vitamin B complex treatment. No claim is made that, in spite of this specific treatment, the drinking habits were in any way affected.

Research on this deficiency is being prosecuted in Thailand and it is asserted that in rural areas there it is difficult indeed to find anybody who does not suffer from it in one form or another. In children cheilosis (another sign of a vitamin B₂ deficiency) is very frequently found.

It is apparent that these symptoms are caused not only by a deficiency of vitamin B₁, but that the whole B-complex is responsible. This accounts for the excellent therapeutic results obtained with either Becozym (Roche) or with vitamin B and liver combinations. One patient was entirely treated and cured by injections of crude liver extract.

Philip Manson-Bahr

BERGOUNIOU, J. L. & TRÉMOLIÈRES, J. Contribution à l'étude de la dégénérescence graisseuse du foie chez le jeune enfant noir (Kwashiorkor). [**A Contribution to the Study of Fatty Degeneration of the Liver in Coloured Children (Kwashiorkor)**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 1, 113-44, 8 figs. on 4 pls.

This review from the Department of Public Health, Dakar, is an excellent account of kwashiorkor based on both personal clinical experience and wide reading. Clinical, pathological and biochemical findings are described. The descriptions follow lines that are now orthodox and those familiar with the work of TROWELL and others on kwashiorkor in Africa will find little new. The study can, however, be strongly recommended to French-reading doctors unfamiliar with the disease, as a clear cut account of this important African problem.

R. Passmore

SPRUE

MOLINIER, A., PÉRONNET, M. & MAITRE, P. Syndrome oedémateux chez un sujet atteint de pseudo-sprue. [**Oedematous Syndrome in a Case of Pseudo-Sprue**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1952, Nos. 11, 12 & 13, 424-30, 1 chart.

DIÉZ RIVAS, F., HERNÁNDEZ MORALES, F. & MEYER, L. M. **The Oral Use of Combined Vitamin B₁₂ and Folic Acid in Tropical Sprue.** *Ann. Intern. Med.* 1952, Apr., v. 36, No. 4, 1076-85, 2 figs. [32 refs.]

" 1. Six cases of tropical sprue in relapse have been treated with combined folic acid and vitamin B₁₂ orally. Folic acid (1.67 mg.) and vitamin B₁₂ (25 µgm.) were administered simultaneously in tablet form every morning.

" 2. In each case, a satisfactory hematologic and clinical response was obtained with this medication.

" 3. The results obtained from this form of therapy in tropical sprue compare favorably with the hematopoietic effect of parenteral liver therapy in this disease.

" 4. Folic acid potentiates the hematopoietic effect of orally administered vitamin B₁₂ in cases with tropical sprue in relapse.

" 5. When daily doses of either 1.67 mg. of folic acid or 25 µgm. of vitamin B₁₂ are given orally to patients with tropical sprue in relapse, no hematopoietic effect is obtained. Simultaneous administration of these same amounts of folic acid and vitamin B₁₂ produces an optimal hematopoietic response in this disease.

"6. It can be concluded that in tropical sprue, as in pernicious anemia, there is a deficiency of both folic acid and vitamin B₁₂, and that the mechanism of absorption and utilization of these two substances is similar in both diseases."

HAEMATOLOGY

BANTON, A. H. **A Genetic Study of Mediterranean Anaemia in Cyprus.** *Amer. J. Human Genetics.* 1951, Mar., v. 3, No. 1, 47-64, 2 figs. [24 refs.]

The author follows others in relating the manifestation of the trait (thalassaemia minor) to Cooley's anaemia (thalassaemia major). He agrees with the hypothesis that one dose of the gene determines the trait and two the full anaemia, though he believes that the picture is influenced by genetic modifiers. He found that about 20 per cent. of a sample of Cypriot school-children manifested the trait, and the frequency reached 50 per cent. in one isolated mountain village. There was no difference between the sexes or between those of Greek and of Turkish descent.

J. A. Fraser Roberts

SILVESTRONI, E. & BIANCO, I. **Genetic Aspects of Sickle Cell Anemia and Microdrepanocytic Disease.** *Blood.* 1952, Apr., v. 7, No. 4, 429-35, 4 figs. [17 refs.]

"1. A brief review is presented of the genetic theories of sickle cell anemia and the sickle cell trait.

"2. The genetic data on 2 families of asymptomatic individuals with the sickle cell trait and of 3 families of patients with sickle cell anemia are reported. These data confirm the heterozygous-homozygous theory of Neel.

"3. The possibility is considered that many of the cases of sickle cell anemia described in the white race are actually examples of 'microdrepanocytic disease.'

"4. Microdrepanocytic disease is a new syndrome, first described by the authors from Italy. It has some of the characteristics of both sickle cell anemia and Mediterranean anemia. On the basis of studies in 11 families, the presence of the sickle cell trait in one parent and of microcythemia (Mediterranean anemia trait) in the other, results in microdrepanocytic disease in some of the offspring. Hematologic studies in these patients indicate the simultaneous presence of both sickle cell and microcythemic genes.

"5. Genetic studies of these families suggests that the genes for microcythemia and for sickle cell anemia are located on different chromosomes and are inherited independently of each other. On the other hand, their simultaneous presence leads to a disease of a moderate degree of severity having many of the features of sickle cell anemia."

NEEL, J. V. **Perspectives in the Genetics of Sickle Cell Disease.** *Blood.* 1952, Apr., v. 7, No. 4, 467-71. [26 refs.]

NEEL, J. V. **The Inheritance of the Sickling Phenomenon with particular reference to Sickle Cell Disease.** *Blood.* 1951, May, v. 6, No. 5, 389-412, 5 figs. [27 refs.]

This very thorough study is based on 75 families. The findings strongly support the hypothesis that one dose of the gene gives sickling and two doses the anaemia. Ninety-four parents were available for examination. On the

above hypothesis all should show sickling ; all except one actually did so. The exception is possibly due to mutation. In certain other matings there is a small deficiency of offspring who show sickling. Various hypotheses are discussed which might account for this and the author states that further work is in progress. One patient with one sickle-cell gene and one for Cooley's anaemia showed a picture indistinguishable from ordinary sickle-cell anaemia.

J. A. Fraser Roberts

LEHMANN, H. **Sickle-Cell Anaemia and Sickle-Cell Trait as Homo- and Heterozygous Gene-Combinations.** *Nature*. 1951, June 9, 931-3. [17 refs.]

It is widely believed, principally on the basis of work with American Negroes, that one dose of the sickle-cell gene gives sicklaemia and two sickle-cell anaemia. This does not agree with experience in Africa, where sickling is even commoner and yet sickle-cell anaemia is very rare. It has been suggested that the homozygotes may in fact die young, without the cause being recognized. The author shows that in samples ranging from the old down to infants in arms, there is no significant difference in the proportions showing the trait. He does not believe that death *in utero* or very soon after birth could have escaped the notice of those working in maternity wards. He agrees that a suggestion by RAPER may provide an explanation of the puzzling discrepancy between Africans and American Negroes : it may be that intermarriage with other races imports something which renders the bearers of two of the sickle-cell genes liable to develop the anaemia.

J. A. Fraser Roberts

SASS, M. **ACTH and Cortisone in the Treatment of Sickle-Cell Anemia. Report of a Case.** *New England J. of Med.* 1952, Apr. 10, v. 246, No. 15, 583-4, 1 fig.

This report, from Ohio, gives a detailed account of the case of a Negro woman of 20, who had suffered from frequent sickle-cell crises from childhood. She was on this occasion admitted to hospital severely ill, with pulmonary complications, and despite repeated penicillin and blood transfusions went rapidly downhill.

On the 8th day after admission, she was started on 25 mgm. of ACTH intramuscularly every 6 hours and responded dramatically within 24 hours. In a few days she was up and about and the dosage was reduced.

On the 35th day, another crisis occurred and "adequate dosage" of ACTH was resumed. This was replaced on the 60th day by 50 mgm. cortisone every 12 hours and the excellent response continued. She was discharged on the 97th day on a maintenance dosage of 50 mgm. cortisone every 12 hours, and was completely asymptomatic. Three weeks later the cortisone dosage was halved and 2 days later thrombophlebitis occurred. The cortisone was increased to 100 mgm. daily and was supplemented with Dicumarol for 6 days. The patient responded well and was discharged 6 days later and is now well and working and taking 100 mgm. cortisone daily.

It was shown that there was a relation between the dosage of the hormones and the difference in aerated and non-aerated sedimentation rates : but it appears that the hormones did not significantly raise the percentage of red cells and haemoglobin, though reduced dosage lowered them. Despite some opinions to the contrary, the author concludes that "this method of treatment in some manner prevents the vascular occlusions commonly associated with this condition" and that ACTH and cortisone "have a definite place in the treatment of sickle-cell anemia and crisis".

H. J. O'D. Burke-Gaffney

VENOMS AND ANTIVENENES

TAYLOR, E. H. **Third Contribution to the Herpetology of San Luis Potosí.** *Univ. Kansas Sci. Bull.* 1952, Feb. 15, v. 34, Pt. 2, 793-815, 1 fig.

FLECKER, H. **Bite from Broad-Headed Snake :** *Hoplocephalus bungaroides* (Boie). *Med. J. Australia.* 1952, Mar. 15, v. 1, No. 11, 368-9.

An account is given from Queensland of the clinical effects of a bite by *H. bungaroides* on the palmar aspect of the middle finger of the left hand. Ligatures were applied above the elbow and above the distal interphalangeal joint of the bitten finger. Excessive venom was wiped away, the wounds were incised and suction from a rubber suction bulb was applied. The finger tourniquet was discarded within the first hour; the other was loosened for 30 seconds every half hour and finally discarded after 5 hours. Tiger snake antivenene was administered 2½ hours after the bite, followed by adrenaline.

Swelling of the finger and arm occurred soon after the bite. Headache developed within an hour and was followed by vomiting. Neurotoxic signs developed in about the same time. On the day following the bite there was difficulty in swallowing, some stiffness of the neck and the patient was unable to move his lower limbs or the affected arm. The symptoms subsided by the third day.

The patient had been bitten by *Demansia psammophis* 5 months before the present episode, and received tiger snake antivenene. At some other (unspecified) time he had been bitten without serious consequences by *H. bungaroides* just after its venom had been milked. The author notes the possibility that these previous experiences might have influenced the clinical picture described above.

B. G. Macgrath

RINDANI, T. H. **Influence of some Ions and Drugs on the Action of Cobra Venom on Frog's Gastrocnemius Sciatic Preparation.** *Indian Med. Gaz.* 1951, Aug., v. 86, No. 8, 338-40.

TABORDA, A. R., TABORDA, Laura C., WILLIAMS, J. N., Jr. & ELVEHJEM, C. A. **A Study of the Desoxyribonuclease Activity of Snake Venoms.** *J. Biol. Chem.* 1952, Mar., v. 195, No. 1, 207-13, 1 fig. [18 refs.]

"1. The desoxyribonuclease activity of several snake venoms, particularly of the genera *Bothrops* and *Crotalus*, has been studied.

"2. The effects of various physical and chemical agents upon the DNase activity of *Bothrops jararaca* venom have been studied in detail. Possible correlation of the activity of this enzyme with toxicity of snake venoms has been discussed."

VAN ARMAN, C. G. **The Origin of Bradykinin.** *Proc. Soc. Exper. Biol. & Med.* 1952, Mar., v. 79, No. 3, 356-9.

"1. The precursor of bradykinin is contained in Fraction IV of the bovine plasma proteins (Cohn's nomenclature). 2. Of the 2 main subfractions, IV-4 yields approximately twice as much bradykinin as IV-1."

SCHÖTTLER, W. H. A. **Problems of Antivenin Standardization.** *Bull. World Health Organization.* Geneva. 1952, v. 5, No. 3, 293-320, 4 figs. [37 refs.]

"The neutralization of two types of snake venom, *Bothrops jararaca* and *Crotalus terrificus terrificus*, by various concentrations of a polyvalent anti-bothropic and of a subspecies-specific anticrotalic serum, respectively, was

investigated in several thousand single experiments carried out chiefly on mice. Comparative parallel series of experiments with mice and pigeons as test animals revealed that the pigeon is not superior to the mouse, so that, for obvious economic and practical reasons, this animal species should be given preference in routine antivenin assay.

"In the in vitro experiments (contact between venom and antivenin before intravenous injection of the mixture) as well as in the therapeutic tests (separate subcutaneous injections of venom and antivenin), the neutralization of venom by increasing antivenin concentrations did not occur in multiple proportions. Relatively less venom was neutralized by higher antivenin concentrations. There was an end-point in the inactivation of the *Bothrops* venom, beyond which further increase in antibody concentration was useless owing to the presence, in the venom, of a toxic component which is not neutralized by the antivenin. The therapeutic test gave higher titres than the in vitro assay in the case of the bothropic antivenin, whereas with the crotalic antiserum the situation was reversed. Different titres were obtained in the titration of the same antivenin with venom samples of different toxicity.

"No congruence between flocculation and neutralization was observed.

"The *Bothrops* venom component which causes local haemorrhage and necrosis was inactivated in vitro but not in vivo.

"Throughout the various types of experiments, the ratio $LD_{100}:LD_0$ in weight of venom was practically the same, regardless of how much venom was involved, which means that the difference between individual LD_0 and LD_{100} , expressed in number of lethal venom doses, increased along with the larger amounts of venom neutralized by increasing antivenin concentrations. These observations lend support to the Bordet theory of antigen-antibody union.

"The average standard error of the figures representing the amounts of venom neutralized by antivenin was 5.8% in the subcutaneous and 5.5% in the intravenous tests with *Bothrops* venom, and 6.6% (subcutaneous) and 8.8% (intravenous) with *Crotalus* venom. The average deviation of single results obtained in repeated experiments for the evaluation of the therapeutic efficacy of the antibothropic serum was 9.2% around their arithmetic means.

"The lack of multiple proportions in venom neutralization by antiserum makes direct antivenin titration impossible and leaves the indirect assay by comparison of the unknown with a standard serum as the method of choice. An international standard of each antivenin type is proposed, to be specified as an antivenin which, in a volume of 10 ml or 50 ml—whichever is the more potent—neutralizes respectively the average, or the maximum, venom dose ejectable by the snake species under consideration. This test should be performed as a curative experiment on larger animals injected with the amount of venom which corresponds to the injection from an actual snake-bite. Further titrations of the unknown against the established standard sera can be carried out by mouse tests. The test venoms should be selected according to the highest toxicity available in sufficient quantity."

DERMATOLOGY AND FUNGUS DISEASES

STUBBS, F. H. & DIXON, J. L. **Coccidioidomycosis : Report of a Case in Georgia.**
Reprinted from *J. Med. Ass. of Georgia*. 1951, Nov., v. 40, No. 11, 469-70.

"A case of progressive coccidioidomycosis (coccidioidal granuloma) is described. To our knowledge this is the first case reported in a native Georgian, except in returned veterans.

"Evidence is presented relating to the source of infection, the long period of time during which the disease was confused with more common respiratory infections, and subsequent identification of the infection by laboratory methods."

[It seems likely that the infection may have been acquired in California nearly 20 years before.]

VOGEL, R. A. & CONANT, N. F. ***Coccidioides immitis* Spherule Antigen in a Complement Fixation Test for Experimental Coccidioidomycosis.** *Proc. Soc. Exper. Biol. & Med.* 1952, Mar., v. 79, No. 3, 544-7.

In serological studies on *Coccidioides immitis* the antigen used has been derived only from cultures of the mycelial form of the fungus, because of the difficulty of obtaining the spherule form in culture. However, the present authors have found that a rich development of the spherule form can be obtained by inoculating the yolk sac of the 10-day-old developing chick embryo with spores of the fungus. Subcultures on to a second series of 10-day-old yolk sacs were made and the resulting growth of spherules was harvested after 9 days' further incubation. The infected yolk was mixed with 4 parts of 10 per cent. sodium chloride solution and, after standing overnight in the refrigerator, the mixture was centrifuged at 3,000 r.p.m. for 30 minutes. The sediment containing the spherules was washed in a few changes of isotonic saline solution and suspended to a 1:50 concentration in veronal buffer solution of pH 7.3-7.4.

The suspension was sterilized by heating in the water bath at 60°C. for 30 minutes. Formalin-killed suspensions were found unsuitable as antigens.

Immune serum for the tests was prepared by infecting rabbits with *C. immitis* and collecting the serum 2 weeks later. Hyperimmune serum was obtained by inoculating rabbits intravenously with 1 ml. doses of the 1:50, heat-killed spherule suspension, at 7-day intervals for 4 weeks and collecting the serum 7 days after the last inoculation. Details are given of the technique of the complement-fixation test and the antibody absorption method of KRUMWEIDE *et al.* employed in the tests. The spherule antigen was not anticomplementary, even when used undiluted; the optimal dilution for the complement-fixation test was 1:4 of the stock suspension.

Comparative complement-fixation tests on 7 samples of immune serum with coccidioidin and with spherule suspension antigens showed the spherule antigen to be slightly superior to coccidioidin in reacting at higher serum dilutions. With the hyperimmune serum the presence of egg-yolk antibody complicated the tests with the spherule antigen, and these sera gave only low-titre reactions or no reaction with the coccidioidin antigen. Absorption tests on one sample of hyperimmune serum showed that egg-yolk antigen could remove all of its homologous antibody and reduce the titre of antibody reacting with the spherule antigen to one-half, but it had no observed effect on the titre of antibody reacting with coccidioidin. Absorption by the spherule antigen removed all antibodies reacting with the spherule, coccidioidin and

egg-yolk antigens. Neither the spherule antigen nor the egg-yolk antigen appeared to have any power to absorb the *coccidioides* antibody from an immune serum.

A preliminary test with human serum from a case of coccidioidomycosis showed an antibody titre of 1 : 32 for the coccidioidin antigen but no reaction with the spherule antigen.

J. T. Duncan

MCVAY, L. V., Jr. & CARROLL, D. S. **Aureomycin in the Treatment of Systemic North American Blastomycosis.** *Amer. J. Med.* 1952, Mar., v. 12, No. 3, 289-301, 6 figs. [52 refs.]

A brief account of North American blastomycosis and its treatment, compiled from the literature, is followed by descriptions of the treatment of 2 cases of the systemic form of the disease by aureomycin. Hitherto, no form of chemotherapy has been found effective in the systemic type of the disease although, in some cases, temporary improvement has followed intensive administration of potassium iodide supplemented by local X-ray therapy.

The patient in the first case, a Negro farmer aged 37, suffered from destructive granulomatous ulceration of the entire face, with severe secondary bacterial infection. The cervical lymph nodes were enlarged and there were signs of extensive disease of the miliary type in both lungs. Six years previously the disease had made its first appearance as a small, painless papule on the side of the nose, which from frequent scratching, had ulcerated and spread to all parts of the face, obliterating the features. Intensive treatment with potassium iodide by the mouth and local X-ray therapy over $4\frac{1}{2}$ years had proved unsuccessful. At this time there were, apparently, no active pulmonary or other visceral lesions, but there were areas of minimal fibrosis and calcification in both lungs. The onset of active pulmonary disease was marked by productive cough with mucopurulent sputum, low grade fever, malaise, drenching night sweats, and dyspnoea on exertion.

Aureomycin was administered by the mouth in doses of 750 mgm. every 6 hours and local treatment with boric compresses and aureomycin ointment was applied to the skin lesions. Within 2 weeks the swollen cervical lymph nodes had broken down and discharged spontaneously, and they had healed completely in 6 weeks. Clearing of the pulmonary lesions became evident after 7 weeks and at the end of 4 months the X-ray picture of the lungs was within the normal limits. Treatment with the full dosage of 3 gm. aureomycin daily was continued for a further period of 6 months, during which the patient's condition remained satisfactory, all mycological examinations gave negative results and there were no toxic signs attributable to the drug. At the end of this period he had received, in all, 928 gm. of aureomycin. At this stage, treatment was discontinued, but one month later the general symptoms and the pulmonary signs returned and *Blastomyces dermatitidis* was present in the sputum. Treatment was therefore resumed with the increased amount of 4 gm. of aureomycin in divided doses daily, and in 4 months the pulmonary lesions had cleared again. Treatment was once more interrupted and one month later the symptoms returned with loss of weight and fever. A third course of treatment similar to the second was given with good results, but, as the facial lesions, although greatly improved, were still active the treatment with aureomycin was supplemented by oral administration of large doses of potassium iodide which brought about rapid healing.

Although all signs of active disease had disappeared, the treatment was continued at 3 gm. of aureomycin daily after discharge from hospital. In all, 1,908 gm. of aureomycin had been given and there had been no toxic signs except

a few transient attacks of nausea and vomiting which were relieved by intravenous injections of pyridoxine hydrochloride.

The results of treatment of the second case bore out the experience with the first, and, from both, it was evident that the fungus did not develop drug resistance. Tests, *in vitro*, with cultures of *B. dermatitidis* from the 2 cases, and 3 other strains, showed that aureomycin was fungistatic at a concentration of about 40,000 µgm. per ml. of the culture medium.

J. T. Duncan

TROPICAL OPHTHALMOLOGY

SIMON, K. **Colour Vision of Buganda Africans.** *East African Med. J.* 1951, Feb., v. 28, No. 2, 75-9. [12 refs.]

Very little research has been done on the colour vision of primitive races and the incidence of colourblindness among them. The author examined 537 male Buganda Africans between the ages of 7 and 32 years, for colour vision. Ten of them were found to be red-green colour-blind, representing a percentage of 1.86. There was not a single case of yellow-blue or complete colour-blindness.

The expected deficiency among European males is 7.8 per cent. so that it would appear that colour-blindness among Europeans was 4 times as common as in Africans. The colour sense of the African could not be assessed because of the poverty of colour nomenclature in his language. Vagueness of colour terms and confusion of colours was due to the fact that brightness and saturation are psychologically more important to primitive man than tone or hue of colour.

E. O'G. Kirwan

FALCONE, G. **Sulle complicazioni oculari da febbre ricorrente in Somalia.** [**Eye Complications of Relapsing Fever in Somaliland**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1951, Nov., v. 32, No. 11, 1031-46, 1 fig. [17 refs.] English summary.

The author has worked both in Abyssinia and in Somaliland. The voluminous robes worn by the inhabitants of the Abyssinian highlands favour louse infestation and both louse-borne typhus and louse-borne relapsing fever are prevalent in that country. The author has seen many cases of relapsing fever, but met no cases of eye complications in the course of 5 years' residence in the Abyssinian highlands. During one year in Somaliland, on the other hand, he found that about 25 per cent. (76 out of 309) of all the cases where the uveal tract or the optic nerve were affected were due to tick-borne relapsing fever which is endemic in that country.

The paper deals with 76 of these cases seen in the Eye Department of the Mogadishu Hospital. These complications occur in patients who have had several relapses some time after apparent recovery indicating a return of the infection. Some of these patients had had no drug treatment; others had received treatment with arsenobenzol preparations and the eye affection cannot, therefore, be due to the latter. The common form is an iridocyclitis. The eye complications appear to be due to spread of the inflammatory process, set up by the specific spirochaete or its toxins, from the central nervous system through the optic nerve to the eye, and more particularly to the uveal tract. It may be that other eye affections of a degenerative type which are prevalent in Somaliland and include keratitis, cataract and optic nerve atrophy are also late complications of relapsing fever and that this disease is a common cause of blindness in that country.

A total of 378 confirmed cases of relapsing fever were treated in the Mogadishu Hospital in the period May 1950–April 1951 : 44 of these, or 11·6 per cent., showed eye complications.

J. Cauchi

See also p. 758, FUKUDA, **Ocular Lesions in Blackwater Fever.**

FERRAND, G. & PARLANGE, J. A. Un essai de "traitement de masse" des conjunctivites saisonnières aiguës en milieu rural marocain. [**Trial of Mass Treatment for Acute Seasonal Conjunctivitis in Rural Areas of Morocco**] *Maroc Méd.* 1951, Apr., v. 30, No. 311, 414–20.

Seasonal mucopurulent conjunctivitis is very common in Morocco. A simple and efficient method of treatment which can be carried out by non-specialized auxiliaries is therefore of great importance. The authors advise instillations of 1 per cent. streptomycin twice a day. Treatment for 5 to 6 days is recommended. The results of this had been satisfactory and cases did not tend to relapse. Trachoma was not immediately affected by this therapy. The follicular conjunctivitis which persisted after streptomycin therapy was treated with instillations of sulphonamide drops. This technique had been found most effective in the Public Health Service of Morocco and allowed the ophthalmic surgeons to devote more time to the operative side of eye diseases which are so prevalent in Morocco.

Nine tables give statistical findings for large numbers of cases in different areas.

E. O'G. Kirwan

CHANG, Hsiao-lou. **A Statistical Study of 13,807 Eye Patients with especial reference to Trachoma and Primary Glaucoma.** *Chinese Med. J. Peking.* 1951, July–Aug., v. 69, Nos. 7/8, 341–9. [11 refs.]

This paper records the findings in 13,807 persons seen in the out-patient clinic of the Tung Jen Hospital, Peking, in 1948. Over 65 per cent. were males and 66 per cent. were aged from 11 to 40 years. The commonest conditions seen were trachoma (45 per cent.), acute catarrhal conjunctivitis (17), phlyctenulosis (13), keratitis (13), corneal opacity (10), and refractive errors (8 per cent.). McCallan's stage II accounted for 62 per cent. of the trachoma cases and of these 55 per cent. were papillary. The commoner complications were pannus (21 per cent.), entropion (7) and trichiasis (6·4 per cent.) ; corneal ulcer occurred in only 3 per cent.

There were 241 cases (1·75 per cent.) of primary glaucoma and 76 of secondary (0·5 per cent.). Females accounted for 64 per cent. of cases of glaucoma. The highest incidence was between 50 and 70 years of age. Absolute glaucoma was present in one or both eyes at the first visit in 49 per cent. of the cases. Simple glaucoma was commoner (34 per cent.) than acute (23) or chronic (8·7 per cent.). Bilateral involvement was present in 53·9 per cent.

The details are presented fully in 12 tables. *H. J. O'D. Burke-Gaffney*

ARAKAWA, S., KITAMURA, O., SEKI, T. & KANEKO, T. Untersuchungen über Trachom. I. Mitteilung : Isolierung, Fixierung und Identifizierung des Virus. [**Investigations on Trachoma. 1. Communication : Isolation, Adaptation and Identification of the Virus**] *Yokohama Med. Bull.* 1951, Aug., v. 2, No. 4, 205–22, 2 figs. [26 refs.]

The authors claim to have isolated the virus of trachoma by intracerebral inoculation of mice of 7 gm. weight with suspensions of conjunctival scrapings taken from persons suffering from trachoma. The mice developed cerebral irritation and conjunctivitis, and died with signs of meningitis. The infection

could be transmitted through 10 passages and attained a titre of 10^7 ; 14 strains were isolated from persons with chronic trachoma and 5 from persons in the acute stage. In 5 instances the infection was passaged through fertile eggs by inoculation of the allantoic membrane. Neutralizing and complement-fixing antibodies to the viruses were demonstrated in rabbit immune sera and in sera from patients with trachoma; the virus was distinct from epidemic keratoconjunctivitis and herpes simplex, but showed some crossing with lymphogranuloma inguinale. Three strains of a virus were also isolated by the intracerebral inoculation of mice with material from 3 patients with inclusion blennorrhoea; it showed no difference from the trachoma viruses in serological tests.

D. J. Bauer

KITAMURA, O. & ARAKAWA, S. Untersuchungen über Trachom. II. Mitteilung: Einflüsse des auf Mausgehirn fixierten Trachomvirus auf gesunde Konjunktiva. [Investigations on Trachoma. II. Communication: the Effect of Mouse-adapted Trachoma Virus on the Normal Conjunctiva] *Yokohama Med. Bull.* 1951, Aug., v. 2, No. 4, 223-33.

Nine persons have been inoculated with the viruses isolated from cases of trachoma as described in the preceding paper. The virus was in the form of a 10 per cent. suspension of infected mouse brain, either fresh or after desiccation *in vacuo*, and was instilled on to the scarified conjunctiva and also injected subconjunctivally. The age of the patients ranged from 42 years to 14 hours after birth; they were observed for up to several weeks after inoculation, and up to 6 inoculations were given at intervals in some instances. Inoculation of the virus produced conjunctivitis in all subjects after 5 days, with development of follicles and enlargement of the pre-auricular lymph glands. The inclusion bodies of trachoma could not be found, however. In one instance material was inoculated subcutaneously, and a mild conjunctivitis with follicles developed after 13 days. The course of the infection was in all cases less severe than with the natural disease, and was milder also in infants. The observations on each subject are recorded in detail.

D. J. Bauer

POŠTIĆ, S. [Aureomycin in Trachoma] *Med. Pregled.* Novi Sad. 1951, Dec., Nos. 11/12, 38-55, 14 figs. on 9 pls. [32 refs.] French & German summaries.

Aureomycin has been used in the treatment of 12 cases of trachoma; a 1 per cent. ointment was applied to one eye every 2 hours, and the other eye was left untreated. Histological preparations of the conjunctivae of both eyes were made every 7 days, in order to assess the effects. The treatment with aureomycin was continued for 3 to 5 weeks, and the control eye was then treated by conventional methods. The application of aureomycin was not followed by any immediate alleviation of symptoms; hyperaemia disappeared gradually and the conjunctiva assumed a milky appearance as a result of the absorption of exudate. The follicles receded and pannus disappeared rapidly; ulcers receded more slowly than with penicillin and sulphonamides, possibly because aureomycin could not be injected subconjunctivally on account of its irritant effect. The inclusion bodies of trachoma persisted during treatment with aureomycin, although showing some morphological changes, and initial bodies could still be found after 5 weeks of treatment. The effect of aureomycin was mainly upon the trachomatous tissue itself; the follicles regressed and degenerated, new connective tissue was formed, and sub-epithelial and perivascular infiltrates disappeared, with the result that healing often occurred without scarring. In view of this effect aureomycin was considered the antibiotic of choice in the treatment of trachoma.

D. J. Bauer

IKEDA, K. & TOYAMA, M. [**Terramycin Therapy in Trachoma**] *I Ryo (Med. J. Nat. Hosps. & Sanatoriums of Japan)*. 1951, Nov., v. 5, No. 11, 16-21. [In Japanese.]

"75 trachoma patients (children) were treated for three weeks with a daily application of terramycin paste to the eye.

"The results are as follows :

"1) 10 to 14 weeks after the beginning of the treatment, 40 patients (55%) were found cured. However, a further follow up of the cases has not been carried out.

"2) Better results seemed to be obtained when Keining's method was conjointly employed.

"3) 14 patients who did not improve during the first 3 weeks of treatment showed no beneficial effect after continuing the same treatment for ten weeks.

"4) No injurious effects were observed by the use of terramycin for the eye."

PAGES, M. R. La lutte contre les maladies oculaires au Maroc. [**The Campaign against Eye Diseases in Morocco**] *Maroc Méd.* 1950, Jan., v. 29, No. 296, 118-23, 2 figs. & 2 charts.

A general discussion of the problem and the means adopted to deal with it.

POLEFF, L. **Introduction à la trachomatologie expérimentale.** [Introduction to Experimental Trachomatology]

This book was reviewed on p. 739.

MISCELLANEOUS DISEASES

DU, Swun-deh. **Favism in West China.** *Chinese Med. J.* Peking. 1952, Jan.-Feb., v. 70, Nos. 1/2, 17-26. [19 refs.]

Favism, a condition arising from ingestion of the bean of *Vicia faba* or inhalation of the plant pollen, has been often reported from Italy, Sicily, Sardinia, the Greek Islands and North Africa, and at times from Palestine and the United States. The present contribution shows that it occurs also in China and may not be very uncommon there, having been misdiagnosed as Lederer's or some other form of acute haemolytic anaemia. In 1944, 2 children were admitted to the West China Union University Hospital and a third in 1947, and all three were diagnosed as cases of Lederer's anaemia. Then, in the 9 days April 28 to May 6, 1951, 8 more were admitted and all gave a history of having eaten the bean. Under the name *hu tou*, the plant is widely cultivated in Szechwan, and, although the author could not find any previous records of favism, he notes a condition known for some time as *hu tou huang*, characterized by jaundice associated with ingestion of the broad bean. Five of the 8 patients had had a similar attack in the spring of the preceding year. Of the 3 theories of causation, the infectious (including parasitic), the toxic and the allergic, the last is the most probable, because the bean is a common article of food in western China but only a comparatively small number suffer from favism, *i.e.*, only a few are susceptible or allergic to it. Tables are given : one, with details of age, sex, symptoms and physical signs of all 11 ; another, with the diet histories of the 8 in April-May, 1951, showing that all had eaten the beans, whereas others in the family who had not eaten them were not affected ; a third table records the results of examination of the blood, the van den Bergh test and the treatment.

Wherever the disease has been reported cases in males exceed those in females [why this is so, whether the males eat more or are more susceptible, is not discussed], and among the 11 cases referred to in this paper only one was in a female, a little girl of 4 years of age. Six had haematuria or haemoglobinuria, 10 suffered from vomiting, 4 had abdominal pain and discomfort, 2 were semi-comatose for a time, all had palpable livers and 3 had palpable spleens. All were anaemic, the red cell count ranging between 920,000 and 1,800,000 per cmm. and haemoglobin from 14 to 25 per cent. ; 5 of the children had normoblasts among the corpuscles ; there was leucocytosis ranging from 13,200 to 36,200 per cmm., and over 60 per cent. polymorphonuclears ; van den Bergh's reaction was delayed. Diagnosis may have to be made also from blackwater fever, but the history and the rarity or absence of malaria parasites will rule this out.

H. Harold Scott

DE FIGUEROA TABOADA, M. Dos casos de acarosis pulmonar. [**Two Cases of Pulmonary Acariasis**] *Med. Colonial*. Madrid. 1952, Apr. 1, v. 19, No. 4, 357-73, 9 figs. & 2 graphs. [16 refs.]

Miyake, H., Oike, K., Amoo, K. & Fujimoto, H. **On the Three Cases with the Acariasis of Lung.** *Shikoku Acta Med.* 1951, June, v. 2, No. 3, 31-3, 2 text figs. & 12 figs. on 2 pls.

PROTOZOOLOGY : GENERAL

JACK, I. B. **Toxoplasmosis : Review of the Literature and Report of a Case.** *Med. J. Australia*. 1952, Mar. 22, v. 1, No. 12, 391-6, 2 figs. [19 refs.]

THALHAMMER, O. Ueber Embryopathien unter besonderer Berücksichtigung der Toxoplasmose. [**Pathological Conditions of the Embryo with particular reference to Toxoplasmosis**] *Wien. klin. Woch.* 1952, May 2, v. 64, No. 18, 323-5, 1 fig.

This paper is reviewed in *Bulletin of Hygiene*, 1952, v. 27, 814.

v. SYDOW, G. Akut toxoplasmos hos spädbarn. [**Acute Infantile Toxoplasmosis**] *Nordisk Med.* 1952, Apr. 25, v. 47, No. 17, 565-7, 5 figs.

The English summary appended to the paper is as follows :—

"A case of congenital toxoplasmosis is reported from the north of Sweden, in which the etiologic diagnosis could be established *intra vitam* by the finding of *Toxoplasma* at direct microscopy of the cerebrospinal fluid. The infant, which had shown no manifest signs of disease during the first week of life, at three weeks had developed massive internal hydrocephalus together with microphthalmus and iridocyclitis and signs of increasing general debility. It died at seven weeks, and autopsy disclosed widespread toxoplasmotic changes both in the central nervous system and, especially, in the lungs."

SVANBORG, N. A. Akut toxoplasmos hos spädbarn. [**Acute Infantile Toxoplasmosis**] *Nordisk Med.* 1952, Apr. 25, v. 47, No. 17, 567-9, 2 figs.

The English summary appended to the paper is as follows :—

"A case is reported of toxoplasmosis in a six-week-old boy in which the diagnosis was verified *intra vitam* by repeated demonstration of abundant *Toxoplasma* in direct preparations from ventricular punctate, while no parasites were concurrently demonstrable in the spinal fluid. At the age of two weeks the

patient had presented symptoms of bilateral iridocyclitis, but was otherwise healthy until the age of five weeks, when there was a sudden onset of cramps without fever. Examination then disclosed severe hydrocephalus, intracerebral calcifications, etc. The patient's condition grew progressively worse and he died at eight weeks. The mother was kept under observation until normalization of the toxoplasmosis titer occurred, and has since been delivered of a healthy child."

MATHESON, K., THJØTTA, T. & STEEN, E. Toxoplasma chorioretinit. Meddelelse om det første kjente tilfelle av toxoplasmosis i Norge. [**Toxoplasmic Chorioretinitis. Report of the First Known Case of Toxoplasmosis in Norway**] Reprinted from *Tidssk. norske Lægeforen.* 1951, Feb. 15, v. 71, No. 4, 111-12, 2 figs.

The English summary appended to the paper is as follows :—

"The authors describe a case of bilateral toxoplasmic chorioretinitis. The disease, which probably was acquired, responded well to treatment with Atebrin."

WISING, P. Akut adult toxoplasmos med lymphadenopathi och chorioretinit. [**Lymphadenopathy and Chorioretinitis in Acute Adult Toxoplasmosis**] *Nordisk Med.* 1952, Apr. 25, v. 47, No. 17, 563-5, 2 figs. [42 refs.]

The English summary appended to the paper is as follows :—

"GARD has described a form of acute toxoplasmosis in adults, characterized by fever and more or less general enlargement of the lymph glands. MAGNUSSON reported a case of acute toxoplasmosis in an adult, where acute chorioretinitis of the congenital and neonatal infection type was the only manifestation of the disease.

"The author here describes a case of acute toxoplasmosis in a 31-year-old female hospital employee. The onset was attended by high fever and enlarged, slightly tender cervical and axillary lymph glands. There was mononucleosis (67.5%), and atypical lymphocytes were found. For this reason, an infectious mononucleosis was at first suspected. The blood picture, however, had returned to normal within four weeks and the Paul-Bunnell test was negative. The patient was afebrile about one week after the onset, but an acute impairment of visual acuity had occurred. This was stated to be due to juxta-macular chorioretinitis. The acuity of vision was less than 0.1. The patient has been under observation since May, 1951. She complains continually of great fatigue and the chorioretinitis has shown no appreciable improvement. Dye and complement fixation test titers have gradually become strongly positive, and the diagnosis seems to be well substantiated serologically. Neurologic examination, liver function tests, and X-ray examination of lungs and skull revealed no abnormality. Toxoplasmata could not be identified on microscopic examination of sections from the sternal marrow.

"The above report shows that the possibility of toxoplasmosis must be borne in mind in cases of acute chorioretinitis, even in adults; and also in those with the clinical picture of infectious mononucleosis when the Paul-Bunnell test is negative."

GARD, S. & MAGNUSSON, J. H. A Glandular Form of Toxoplasmosis in connection with Pregnancy. *Acta Med. Scandinavica.* 1951, Nov. 6, v. 141, No. 1, 59-64.

The authors state that they have encountered 3 adults with a glandular form of toxoplasmosis; they describe one case.

From June 24th to 27th the patient, a female aged 23 years, suffered a slight febrile illness with a cough and tenderness of the glands in the neck. On July 1st she had slightly tender movable bilateral glands in the neck and one behind the mandible, but was otherwise free from symptoms. By July 15th these had increased slightly in size and the glands in the axillae had enlarged. The blood count was within normal limits and during the next few weeks the sedimentation rate varied between 12 mm. and 27 mm. in one hour. The glands decreased in size and by August 22nd further observation was considered unnecessary, but as the patient was pregnant she was referred to a maternity clinic, where routine intracutaneous and Sabin-Feldman dye tests for toxoplasmosis were performed: the former was strongly positive and the latter showed a positive titre of 1 in 50. At this stage a lymph gland was removed and examined histologically; intracellular oval bodies that resembled toxoplasms were observed and the inflammatory reaction in the gland was similar to that usually seen in toxoplasmosis.

The patient and the child, when it was born, were kept under observation. The titre of the dye test in the mother rose to 1 in 2,000 on November 22nd and 1 in 4,000 on December 30th. It fell gradually to 1 in 500 on February 19th and remained about this level during the remainder of the period of observation. The child had a positive dye test 2 weeks after birth; 3 months later this had fallen to 1 in 500; and it became negative after another 7 months. The complement-fixation test of the mother became positive (1 in 48) on March 31st, when the test in the child was positive (1 in 12).

The newly-born infant never showed any clinical signs of the disease, nor did another child of the patient now aged 3 years. The patient herself showed no further signs of the disease.

L. E. Napier

BARBOSA, A. G. & AMARAL, A. D. F. Sobre a presença de flagelados do gênero *Trichomonas* no pulmão. [Presence of *Trichomonas* in the Lungs] *Folia Clin. et Biol.* S. Paulo. 1950, Dec., v. 16, No. 2, 169-79, 3 figs. [25 refs.] English summary (8 lines).

HAIBA, M. H. & WILLIAMSON, J. The pH of the Small Intestine of Normal, Starved and *Giardia*-Infected Norway Rats. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Jan., v. 46, No. 1, 85-93. [35 refs.]

Since the pH of the intestinal wall might be an important factor in infections with *Giardia* and since previous methods of its determination were not free of fallacies, the authors have used the capillary glass electrodes, calibrated against a series of 5 buffers (pH 4.00-8.04), for the determination of pH of the intestine of rats infected with *G. muris* and *G. microti*, and in normal animals. After the anaesthetized animals were dissected on insulated boards, the electrode capillary was inserted through an incision at intervals of 6 inches along the small intestine, and separate readings were taken for the intestinal contents and—after removal of the latter—of the wall. The results are shown in a number of tables. There was marked hyper acidity in the upper region of the jejunum of young rats infected with *G. muris* and in the lower region of the ileum in adult rats infected with *G. microti*, which corresponded to the points of maximum concentration of the two parasites. It was also found that in starved animals there is marked alkalinity of the small intestine. The rapid elimination of *Giardia* observed in starved rats may therefore be due to the deleterious effect of the changed reaction upon the acidophilic flagellates.

C. A. Hoare

ENTOMOLOGY AND INSECTICIDES : GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

GUILLAUME, A. & MEYER, A. Contribution à la lutte contre les moustiques en Alsace : plan d'assainissement du ried alsacien et revalorisation des terres. [Study of Mosquitoes in Alsace. Plan for Sanitary Improvement and Land Reclamation of an Alsace Area] *Rev. Paludisme et Méd. Trop.* 1952, Apr. 15, v. 10, No. 94, 73-8. [10 refs.]

MICKS, D. W. & ELLIS, J. P. Free Amino Acids in the Developmental Stages of the Mosquito. *Proc. Soc. Exper. Biol. & Med.* 1952, Jan., v. 79, No. 1, 191-3, 2 figs.

In this work, the authors set out to study the changes in amino-acid levels that occur throughout the life-cycle of an insect. Mosquitoes were chosen on account of their short life-cycle and rapid growth, the species being *Culex fatigans* and *Aedes aegypti*. Eggs, fourth-stage larvae, pupae, and unfed adults were examined, and the whole tissues were used, being homogenized in a tissue grinder with water at the rate of 1 ml. to 200 mgm. of tissue. The amino-acids were separated by the method of paper chromatography, with water-saturated phenol and 2,4-lutidine (3 parts to 1 part water) as the solvents. The presence of amino-acids was revealed by spraying with 0.2 per cent. ninhydrin in water-saturated butanol, and heating to 80°C. for 15 minutes.

The free amino-acids found in all stages were as follows : alanine, glutamic acid, β -alanine, iso-leucine, leucine, taurine, proline, histidine, serine, valine, methionine, threonine, lysine, arginine, aspartic acid, glycine, tyrosine, and tryptophan. The highest concentration of amino-acids was in the larvae, followed by adults, eggs, and pupae, in that order of concentration. The pupae had, however, more tyrosine and alanine than the other stages. The amino-acid level in pupae was lowest shortly before the emergence of the adult. The eggs and larvae had more aspartic and glutamic acids than other stages. These results are in general agreement with those of other workers [this *Bulletin*, 1949, v. 46, 408] on these and other insect species.

A. J. P. Goodchild

STABLER, R. M. Parasitism of Mosquito Larvae by Mermithids (Nematoda). *J. Parasitology.* 1952, Apr., v. 38, No. 2, 130-32, 2 figs. [11 refs.]

"1. Larval mermithid nematodes were found in fourth instar mosquito larvae from pools adjacent to Cobb's Creek at Colwyn, Delaware Co., Penna.

"2. Seventy-six of 146 *Aedes vexans*, 4 of 53 *Culex salinarius*, and 10 of 18 *C. pipiens* were infected.

"3. The worm completely prevented the mosquito's pupation, and the latter died soon after the worm's emergence from the insect's thorax."

LARI, F. A. A Description of the Larval Stages of *Wohlfahrtia nuba* (Wiedemann), (Diptera : Calliphoridae) with Notes on Bionomics and Distribution. *Pakistan J. of Health.* 1952, Jan., v. 1, No. 4, 64-73, 8 figs. [21 refs.]

KEILBACH, R. Butter als Nährsubstrat für Dipterenlarven. [Butter as a Food Substrate for Dipterous Larvae] *Ztschr. f. hyg. Zool.* 1951, Oct.-Dec., v. 39, Nos. 10/12, 296-9, 4 figs.

During 1950 several cases of fly larvae attacking butter were reported. Larvae from samples of butter taken into the laboratory pupated, but no

adults emerged. Attempts were made, therefore, to identify the species of fly, from the larval stage. The larvae appeared to be most closely related to *Lucilia*, since the posterior and anterior spiracles were similar to those of *Lucilia*, and the cephalo-pharyngeal skeleton was of the Calliphoridae type.

It is suggested that large slabs of unwrapped butter become infected in the shop where flies are attracted by meat and cheese. The larvae soon develop in the high summer temperatures, but the life cycle is not completed because there is insufficient nutrient in butter alone. Such infestations of butter by fly larvae may be avoided by packing small quantities of butter in strong paper.

C. Mary Harrison

WEST, Luther S. **The Housefly. Its Natural History, Medical Importance, and Control.**

This book was reviewed on p. 735.

KANO, R. & SATO, K. **Notes on the Flies of Medical Importance in Japan (Part V). Classification of Japanese Female Blowflies by the Characters of Tergites and Sternites.** *Japanese J. Exper. Med.* 1951, July, v. 21, No. 2, 229-41, 15 figs.

KANO, R. **Notes on the Flies of Medical Importance in Japan (Part IV). Flies of Hachijo Area.** *Japanese J. Exper. Med.* 1951, July, v. 21, No. 2, 223-7, 11 figs.

HOFFMAN, R. A., ROTH, A. R., LINDQUIST, A. W. & BUTTS, J. S. **Absorption of DDT in Houseflies over an Extended Period.** *Science.* 1952, Mar. 21, 312-13.

MILLER, A. C., MALLIS, A. & SHARPLESS, R. V. **Aerosol Insecticides. Their Evaluation against House Flies, Cockroaches. Part II.** *Soap.* New York. 1952, Mar., v. 28, No. 3, 143-9.

Preliminary experiments are described to show the effect of several factors important in evaluating test aerosols containing pyrethrins, piperonyl butoxide and either DDT or methoxychlor in the Peet-Grady chamber. Studies of dosage of house-flies indicated that increase of dosage by two- or three-fold of a highly effective formula gave negligible difference in percentage "knock down" (K.D.) and percentage mortalities, but that a less effective formula gave an appreciable increase. Increase in temperature from 70° to 80°F. was shown to have a marked effect on both 15-minute K.D. and 24-hour mortalities in high- and low-pressure aerosols, and this was thought to be due to the greater activity of flies at higher temperatures, enabling them to pick up a larger dose. It was necessary to control the height and manner of aerosol discharge to obtain uniform results, as is shown by the slightly higher K.D. and kill which was obtained when the aerosol discharge was at 1 ft. rather than at 2 ft. from the ceiling of the chambers. Slow and fast "Tentative Official Test Aerosol" (TOTA) dispensers, discharging 13.9 and 9.2 gm. in 10 sec., had no appreciable effect on 15-minute K.D. and 24-hour mortalities. Tests with the low-pressure aerosol and the TOTA on groups of 10, 100 and 500 flies, showed that percentage K.D. and mortality rates were greater for the large groups of flies. It was considered possible that greater movement among the flies in these groups would account for this. The comparison of two formulations with the TOTA showed that the meeting of the standard by these depended on whether the "Aerosol Test Knockdown Mortality" or the "Aerosol Test Mortality" is used.

Tests were conducted in the 1,000 cu. ft. aerosol chamber with the use of American, Oriental and German cockroaches. These were placed within a steel hoop 3 inches high and exposed to the mist for 15 minutes : 30-minute K.D. and 48-hour mortality counts were made after aerosol space applications at 75 gm./1,000 cu. ft. and direct-spray applications of 5 gm. from 30 inches height. The latter equalled 1.7 times the dosage/unit area of the space applications and were in general more effective. The German roach, being the smallest, was the most susceptible.

Ruth Nash

BARRETT, W. L., JR. **Control of House Flies with Methoxychlor in Texas Dairy Barns.** *J. Econom. Entom.* 1952, Feb., v. 45, No. 1, 90-93.

BARRETTO, M. P. Duas novas espécies de flebótomos brasileiros (*Diptera, Psychodidae*). [**Two New Species of Brazilian Phlebotomus**] *Folia Clin. et Biol. S. Paulo.* 1950, Dec., v. 16, No. 2, 143-9, 7 figs. [15 refs.]

DOLMATOVA, A. V. [**Morphological Adaptations of Sandflies (*Phlebotomus*) to Dry and Humid Climate**] *Dokl. Akad. Nauk SSSR (N.S.)* Moscow. 1949, v. 69, No. 2, 285-8, 1 graph. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1952, Mar., v. 40, Pt. 3, 48-9.]

The species of *Phlebotomus* of the Soviet Union are xerophilous, whereas those of tropical regions favour moist conditions. Since similar differences among species of *Anopheles* have been shown to be related to the size of the spiracles, this character was investigated in sandflies of several species from Rio de Janeiro and Belém in Brazil which have an annual rainfall of rather more than 1,000 and 2,000 mm., respectively, and from various parts of the Soviet Union. The length of the fore spiracle expressed as a percentage of the dorsal length of the mesothorax was taken as the spiracle index. The indices of the Rio and Belém sandflies were 7.8 and 8.29. Those for the Soviet sandflies and, in brackets, the annual rainfall where they were collected were 6.64 and 6.73 for two batches of *P. papatasi* (Scop.) (119-183 and 341 mm.), 6.93 for species of the group *P. minutus* (Rond.) (119-183 mm.), 7.14 for *P. perniciosus* var. *tobbi* Adl. & Thdr. (518 mm.) and 7.43 for *P. major* Annan. (545 mm.).

P. papatasi and the species of the *minutus* group are resistant to dryness. The world distribution of *P. perniciosus* var. *tobbi* and *P. major* is outlined and it is pointed out that although they occur in dry places in the Soviet Union and elsewhere, they are chiefly associated with sea coasts, and it may be assumed that in countries with a dry climate they are able to exist only in biotopes and shelters in which the microclimate is more humid than the environment.

It is concluded that there is a connection between the relative dimensions of the spiracles of sandflies and the humidity of the regions in which they occur and that the spiracle index can be taken as an indicator of their resistance to dryness.

BRENNAN, J. M. **Two New Venezuelan Chiggers (Acarina : Trombiculidae).** *J. Parasitology.* 1952, Apr., v. 38, No. 2, 143-6, 2 figs.

SASA, M. **Further Note on Mites of the Genus *Dermatophagoides* Bogdanoff found from Human Acariasis (Acarina, Epidermoptidae).** *Japanese J. Exper. Med.* 1951, July, v. 21, No. 2, 199-203, 4 figs.

CHOW, C. Y., YUE, T. F. & CHEN, T. N. **Camphor Oils as Solvents for D.D.T. and Gammexane.** *Indian J. Malariology.* 1951, June, v. 5, No. 2, 187-94, 2 charts.

In some areas, petroleum or coal by-products are uneconomic for large-scale use as insecticide solvents and vegetable oils may be used instead.

The authors have tested, for this purpose, 2 by-product oils from the manufacture of camphor in Formosa. They have the following properties :—

	Boiling Point range (°C.)	Flash Point (°C.)	At 25°C.	
			Viscosity (poises)	Gm. DDT dissolved by 100-ml.
White Camphor Oil ...	130-200	60	·015	20
Brown Camphor Oil ...	184-240	93	·030	29
Odourless Kerosene ...	200-260	70	·026	4
Xylene	138-145	27	—	57

[Data for kerosene and xylene added by abstracter for comparison.]

Five per cent. solutions of recrystallized DDT or *gamma* BHC were prepared in the camphor oils and tested for toxicity to *Culex fatigans* larvae. Both oils were slightly larvicidal alone, and the insecticide solutions were highly effective in laboratory tests at several temperatures. The brown oil was somewhat better than the white, and the BHC solution better than the DDT.

The authors conclude that these oils would be very satisfactory for preparing larvicides.

J. R. Busvine

MACKAY, I. A. **Recent Advances in Insecticides.** *J. Roy. San. Inst.* 1952, May, v. 72, No. 3, 187-92.

LESSER, M. A. **Insect Repellents.** *Soap.* New York. 1952, Mar., v. 28, No. 3, 136-7, 141-2, 173. [57 refs.]

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

SOUTHERN RHODESIA. **The African in Southern Rhodesia. No. 2. Health.** 16 pp., 6 illustrations. [1952] Printed for the High Commissioner for Southern Rhodesia, Rhodesia House, 429 Strand, London, W.C.2, by R. MacLehose & Co., Ltd., Glasgow.

This pamphlet entitled "Health" is one of a series designed to give the facts on the place of the African in Southern Rhodesia, the services provided for him and his response. In this self-governing territory, the present main problems are "to induce the African to acquire the knowledge and the sense of responsibility which will permit him to undertake the health promotion of his own people at all levels of professional and technical skill, and for this purpose steadily to provide the facilities for higher training".

The State Department of Health provides and maintains curative services in the form of hospitals, clinics, maternity homes and out-patient departments. There are nearly 10,000 hospital beds for rather less than 2,000,000 Africans, a ratio of 1 bed to 213 people. New 1,200-bed hospitals in Salisbury and Bulawayo, when completed, will become training schools for male and female nurses. Up to the present, suitably qualified girls are sent at Government expense for either nursing or midwifery training to South African Schools. There are now 20 qualified African nurses in the Government service.

The Medical Council maintains a register of nursing orderlies, entries to which are restricted to those who have successfully completed practical, oral and theoretical examinations after a 3-year course of training at approved institutions, which include medical missions; there are always far more applicants than vacant places in these training schools. The qualified female orderlies usually take a further year's course in midwifery at the Government schools set up for this purpose to enable them to qualify as Maternity Assistants.

The Government has instituted a training centre for African Hygiene Demonstrators; a 3-year course covers the following subjects:—English, arithmetic, bricklaying, carpentry and the principles of hygiene and sanitation; included is the usage of modern insecticides for anti-malarial and anti-schistosomiasis spraying. When qualified, they are stationed in pairs in African settlements and rural areas. A start has been made in the training of African medical practitioners by sending suitable types to South African medical schools.

Under the Secretary for Health is a Director of Preventive Services whose staff is responsible for the control of epidemic disease and the major diseases, malaria, schistosomiasis and tuberculosis, by modern methods.

The pamphlet is illustrated by several good photographs. *R. Ford Tredre*

JIROVEC, O. **Present State of Parasitic Diseases of Human Beings in Czechoslovakia.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1952, v. 4, No. 1, 123–5. [Also fuller version in Polish 109–19 & in Russian 120–23.]

The position regarding malaria in Moravia has already been noted [this *Bulletin*, 1948, v. 45, 480]. It is stated that the post-war epidemic was stamped out by means of control and by isolation of patients during treatment. In Slovakia, however, it has been endemic since early times. Between 1946 and 1950, there were 4,523 *P. vivax* and 93 *P. falciparum* infections. In Eastern Slovakia the vectors are members of the *A. maculipennis* group, especially *A. m. messeae*. In 1950, 16 villages were sprayed with 49,000 litres of a preparation consisting of 30 per cent. emulsion of DDT in xylene with the addition of resin soap.

The author mentions that *Trichomonas vaginalis* infection is widespread and regards it as a true venereal disease. It was found in 30 to 60 per cent. of women. It is stated that several hundred thousand women in Czechoslovakia are affected and that it is two or three times more frequent than gonorrhoea.

Leptospirosis is sporadic, and large numbers of cases conveyed by rats were concentrated in Prague and other cities. In 1950, there were 440 confirmed cases of mud fever.

Entamoeba histolytica cysts were found in 0.1 per cent. of 800 children in Prague and 1.5 per cent. of 440 persons in Zlin. The corresponding figures for *E. coli* were 14.4 and 16.8. Other intestinal protozoa were comparatively rare. Cases of toxoplasmosis have been confirmed serologically in man. Between 1938 and 1948, it was found in 10 per cent. of some 500 hares examined.

Pneumocystis carinii was found in 16 infants who died of atypical bronchopneumonia.

Enterobius was the commonest helminth found. Details are given of findings in 5,500 persons examined in 1949-1950, and in children of school age as many as 79 per cent. were found infected in some areas. Other helminthic infections are less common, though in Slovakia, as many as 36.3 per cent. of children in one area harboured *Trichuris*. Trichinosis is rare. It is said that while *Taenia solium* is becoming rarer, *T. saginata* is on the increase.

Finally, it is stated that ticks "play a certain role as vector of encephalitis in forested regions".

H. J. O'D. Burke-Gaffney

WEBB, L. J. **Guide to the Medicinal and Poisonous Plants of Queensland.** Commonwealth of Australia Council for Sci. & Indust. Res. Bull. No. 232. 202 pp. [Numerous refs.] 1948. Melbourne.

BOOK REVIEW

COMMONWEALTH AGRICULTURAL BUREAUX. **Gazetteer of Agricultural and Forestry Research Stations in the British Commonwealth 1952.** Including a list of such stations in the Republic of Ireland. pp. xix+517. 1952. Farnham: Bucks. [30s.]

This Gazetteer, believed to be the first publication of its kind, contains particulars, compiled from material supplied by Governments, of over a thousand agricultural research stations and laboratories and experimental farms concerned with almost every branch of agriculture and forestry research throughout the Commonwealth. It is designed to supplement the List of Research Workers in Agriculture and Forestry also published by the Commonwealth Agricultural Bureaux. The information given for each research station includes location, climate, altitude, soil, crops, research, and finally, postal address.

The arrangement of entries in the Gazetteer is similar to that adopted for the List of Research Workers, beginning with particulars of organizations serving Commonwealth countries as a whole, followed by particulars of research stations set out under countries and numbered progressively throughout the volume. This serial numbering of entries is based on a system of allotment which enables a reader to identify from the number the part of the world in which a station is situated, e.g., United Kingdom 1-200, Canada 201-400, Australia 401-600, and so on. Two indexes are provided: I—An alphabetical index of research stations, and II—An alphabetical index of subjects of research, and the references in both these indexes (as also the cross references in the text) are to the allotted serial numbers and not to page numbers, so that users may easily recognize from the numbers the particular countries to which index entries or cross references relate.

R. L. Sheppard

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